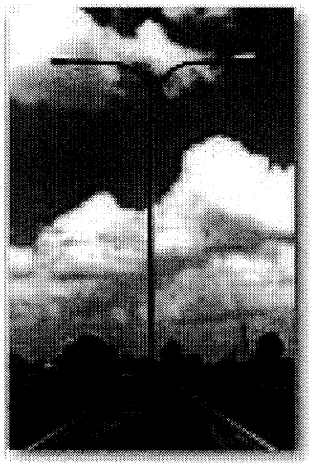
STREETLIGHT DESIGN

Technical Design Manual #6



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CITY OF CHANDLER

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CITY OF CHANDLER

PUBLIC WORKS DEPARTMENT

STREETLIGHT STANDARDS AND SPECIFICATIONS

Revised July 2001

POLICY:

Developers of residential, commercial, and industrial properties are responsible for the design and installation of streetlights for the development per the current subdivision code. Streetlight plans and details shall be included with the improvement plans and shall be submitted for review by the City Transportation Engineer. All streetlight designs, materials and installations for public streets shall conform to the latest edition of the City of Chandler Streetlight Standards and Specifications. Any deviations from these standards shall be approved by the City Transportation Engineer. Lighting for private streets shall also meet the shielding requirements and illumination requirements of these standards. Under no circumstances shall any streetlight or street lighting system be installed without approval of the City Transportation Engineer.

GENERAL:

Streetlight designs shall use high-pressure sodium luminaries controlled by individual photocells, mounted on steel poles. Spacing of luminaries shall be based on mounting height, type of luminaries, and illumination level requirements listed in Appendix A.

New streetlight circuits shall be installed below grade.

Streetlights shall be fully shielded in such a manner that light emitted by the fixture, either directly from the lamp or indirectly from the luminaries is projected below a horizontal plane running through the lowest point on the fixture where light is emitted.

Intersections at all local and collector type streets shall have at least one streetlight at the intersection. Minor and major arterial intersections shall have at least two streetlights at the intersection. Near existing or future signalized intersections, streetlight plans shall be coordinated with streetlights mounted on the traffic signals. Street surfaces in cul-de-sacs or bubbles must be illuminated to the same standards as local streets.

DEVELOPERS SHALL COORDINATE THE LIGHTING SYSTEM DESIGN AND ELECTRIC SERVICE FOR THE LIGHTING SYSTEM WITH THE UTILITY COMPANY SERVING THAT SYSTEM.

The Developer shall conform to the latest requirements of the serving utility and pay all energization fees. Design criteria reproduced here for Salt River Project and Arizona Public Service are for reference only, and do not relieve the Developer of any coordination requirements.

Plans for a streetlight system submitted to the City Transportation Engineer for approval shall show the location of the nearest existing streetlight including details of luminaire type, output, wattage's, mounting height, and pole type. The City Transportation Engineer may require computerized point-to-point lighting calculations indicating maintained foot-candle levels at ten foot intervals between luminaries and across the width of the roadway for projects. Streetlight plans shall be an individual plan set except as approved by the City Transportation Engineer.

Streetlights for local or collector streets shall generally be located at the side lot lines on the south or west sides of the streets. On arterial streets, lights shall be placed on both sides of the street in a staggered arrangement. If medians are present and are of sufficient width, streetlights may be placed in the median using poles mounted with double mast arms.

ADJUSTMENTS TO POLE SPACING

The maximum pole spacings listed in Appendix A may be exceeded by up to ten percent as needed to achieve rational spacing and location of streetlight poles in the right-of-way. For City streetlight upgrade projects, pole spacing may be varied to meet lot line requirements and an overhead conductor may be installed when underground installation is impractical. The City Transportation Engineer must approve all adjustments.

PRIVATE STREETS IN LOW-DENSITY RESIDENTIAL AREAS

The policies contained in this section apply only to lighting of private streets in low-density residential areas (less than 2.5 units per acre).

Within the intersection area (defined by extension of roadway tract or roadway easement boundaries of the intersecting streets), the average illumination shall be at least 0.3 foot-candles and the average-to-minimum uniformity ratio shall be 6 to 1 or less. Lights shall be controlled by photoelectric cells or similar devices causing them to be turned on automatically during hours of darkness. Any type of lam or mounting may be used for intersection lighting, including bollard-style lights. If lamps are mounted at heights of less than 12 feet, fixtures must be designed to minimize glare for motorists, cyclists and pedestrians. Lamps exceeding 70 watts shall be fully shielded.

Where intersection lights are mounted at heights of less than 12 feet, the design of street name signs and lights shall be coordinated to ensure that the street name signs can be easily located and easily read during hours of darkness.

Lights shall also be placed at driveway or sidewalk entry from the private street, and shall illuminate the corresponding address number. These lights shall be controlled by photoelectric cells or similar devices causing them to be turned on automatically during hours of darkness. Homeowner's associations may choose to specify the type of lights to be used at driveway entries (e.g., bollard, globe, and gas lamp style) by codes, covenants and regulations applicable to their subdivision. Lamps exceeding 70 watts shall be fully shielded.

SECTION 1 - SERVICE AREAS

The following are three different streetlight systems in use in various areas within the City:

Area S: This area is served by the Salt River Project (SRP) and includes all areas of the City not part of areas □A□ and □C□ described below. Street lighting in this area shall be designed and installed by developer. Once installed, ownership shall be turned over to the City of Chandler.

Area A: This area is served by the Arizona Public Service Company (APS). Street lighting in this area shall be designed and installed by the developer or by APS at the option of the developer. If the developer opts to provide the streetlights, ownership will revert to the City after completion of the system. If the developer opts to have APS provide the streetlights, the developer shall pay the "Investment by Others" costs to APS, but the streetlights will be owned by the City.

Area C: This area is located in the City Center and is served by APS. Street lighting in this area shall be designed and installed by the developer. Once installed, ownership shall be turned over to the City of Chandler.

See detail SL-A for delineation of the areas.

SECTION 2 - NEW STREETLIGHT INSTALLATIONS

2.1 All new subdivisions and construction projects within the City of Chandler requiring streetlights shall use the poles as identified by the following pole details:

A. Detail SL-1 shall be used for all new streetlight installations, except as noted below.

B. Detail SL-17 shall be used in lieu of SL-1 or SL-1A when overhead height restrictions or clearance problems exist. SL-17 may not be intermixed with other types of poles.

C. Detail SL-16 may be used as an option to SL-1 throughout a subdivision or major non-residential development, with pre-approval of City Transportation Engineer. SL-16 may not be intermixed with other types of poles.

D. Detail SL-10 shall only be used in Service Area C (City Center).

E. Details SL-6 and SL-8 may be used in Service Area A (APS) with approval of the Transportation Engineer. SL-6 and SL-8 may not be intermixed with other types of poles..

2.2 All poles shall have a minimum setback of 2.5 feet from back of curb, and a one (1) foot clearance from existing or proposed sidewalk. In certain situations, double davit streetlights may be placed in the center of the median less than 2.5 feet from back of curb as approved by the City Transportation Engineer.

2.3 In order to maintain aesthetic continuity along major streets, the same type of pole (SL-1 or SL-17) shall be used on both sides of the street for at least half-mile sections.

SECTION 3 - LUMINAIRES

3.1 STANDARD LUMINAIRE

A. General:

Luminaries shall be designed for roadway lighting with built-in ballast for use with a high-pressure sodium lamp. The luminaries shall bear the UL label. All luminaries shall be mounted with a zero-degree tilt from horizontal.

B. Housing:

The housing, both upper and lower, shall be die-cast aluminum jointed by an integrally cast pin hinge at the mounting and a one-hand latch at the door enclosing the lamp and/or ballast (GE Power/Door or AE Power-Pad Series). The housing shall have an integral four bolt, 2 inch slip fitter mounting for installation on mast arm and shall provide adjustment for leveling the luminaries.

Exterior hardware shall be of stainless steel.

The finish shall be baked-on enamel and the color shall match that specified for the pole in Section 7.4.

C. Lens:

The lens shall be a clear, tempered, high-quality, heat-resistant glass with no aberrations and shall be secured in the supporting frame.

D. Reflector:

The reflector shall be of drawn aluminum and have a highly reflective surface. The reflector edge shall have an elastomer gasket which seats firmly against the lens door to seal the optical system. The optical system shall have a filter permitting it to breathe during lamp heat-up and cool-down.

E. Ballast:

The ballast shall be securely mounted in the compartment provided on the door. The ballast shall be pre-wired at the factory and shall be suitable for at least 115 degrees Fahrenheit ambient temperature operation. The ballast shall be the lag regulating type, constant wattage, single lamp with a primary power factor of 90 percent or higher. The primary voltage rating shall be 120 volts in all areas except that APS may require a 240 volts ballast on non-residential streets in Area A (the Developer shall coordinate voltage requirements with APS).

F. Lamp Socket:

The socket shall be high-quality, rugged, porcelain, mogul type with corrosion-resistant clamp-type terminals and lens. The socket shall be provided with a heat-resistant gasket for sealing the optical system.

G. Photo Cell Socket:

A locking-type photocell receptacle in accordance with EEI-NEMA standards shall be provided in the top of the housing to accept the photocells specified in Section 4.

H. Approved Manufacturers:

General Electric M-400 A2 Powr/Door Cutoff Series (250W)
General Electric M-250 A2 Powr/Door Cutoff Series (100 & 150W)
American Electric Series 325 Power-Pad Cutoff Series (100 & 250W)
American Electric Series 313 Power-Pad Cutoff Series (100 & 150W)
American Electric Series (ITT) 53 or 153 Luxmaster Series (100 & 150W)

3.2 CITY CENTER LUMINAIRE

A. General:

All paragraphs of Section 3.1 shall apply to these luminaries, except as noted.

B. Housing:

The housing shall be a formed aluminum rectangular unit with a hinged lens door. Access to the optical compartment shall be available without the use of tools. It shall contain an integral 2-inch slip fitter mounting for installation of mast arm and shall provide adjustment for leveling the luminaries.

The finish shall be baked-on enamel and the color shall match that specified for the pole in Section 7.

C. Approved Manufacturer:

General Electric Decashield III Series

(A) DS-400 C596N543 w/o mounting arm (250W, 120V)
(B) DS-400 C596N545 w/o mounting arm (250W, 240V)
(C) DS-400 C595N532 w/o mounting arm (150W, 120V)
(D) DS-400 C595N534 w/o mounting arm (150W, 240V)

SECTION 4 - PHOTOCELLS

4.1 Photoelectric control shall be an A.C. operated, cadmium sulfide cell controlling a relay specifically designed for photocontrols which will operate at low power levels and accommodate the conventional load requirements that occur in standard luminaries designs. During the day the relay is energized, holding its contacts open and the lamp load off.

Electronic photocells shall have surge protection arrestor to protect the photocell and luminaries from surges produced by power line switching and lighting.

Any component failure shall result in the lamp remaining on continuously.

The photocontrol shall be twist lock, three pole, with a housing fabricated of high impact poly-acrylic with ultraviolet inhibitor, conforming to NEMA Publication #SH18-1957 and proposed revisions. Photocontrol shall be factory set for turn-on at 1f.c. (foot-candle) and turn-off at 3f.c. and shall be installed facing north.

4.2 Approved Manufacturers:

Electromechanical:

Fisher Pierce No. 7760 (120V)
General Electric No. C402G600 (120V)
American Electric 8060-4F (120V)
Fisher Pierce No. 7770 (240V)
General Electric No. C402G660 (240V)
Precision Multiple Controls No. 8690 (105-280V)

Electronic:

Fisher Pierce No. 7571B (120V)
Fisher Pierce No. 7572B (240V)
Precision Multiple Controls No. EC-120 (120-277V)
Tork No. 5227 (120V)

SECTION 5 - LAMPS

5.1 Lamps shall be high-pressure sodium types as follows:

Wattage	Lumens	ANSI Designation
100	9,500	S54SB-100
150	16,000	S55SC-150
250	30,000	S50VA-250/S

A. Approved Manufacturers:

Sylvania
General Electric
Philips

B. Service Life:

Lamps shall be supplied with each luminaries. These lamps shall have a minimum average service life of 24,000 + hours at 10 hours per start. Lamps that do not meet this service life will not be accepted.

5.2 In large lot residential areas where lot frontages do not conform to standard pole spacing, 70-watt streetlights may be used on local streets with the approval of the City Transportation Engineer.

SECTION 6 - POLE FABRICATION

6.1 Design (Pole SL-1, SL-1A):

The pole may be either a sectional telescopic design or a tapered design. The number, length and diameter of the sections for a sectional telescopic design shall be as specified for the varying pole heights. Details SL-1, SL-1A, SL-2, and SL-2A identify the pole and mast arm required for each type of street.

The adjoining sections shall overlap as shown on the standard drawings.

The pole shall provide a rigid support at the mounting height for a fixture weighing as much as 50 pounds with a projected area of three square feet. The pole shall be capable of withstanding a wind load of 80 mph per AASHTO specifications with the fixture attached to a six or eight-foot mast arm. Steel or aluminum poles are acceptable.

A steel pole shall be constructed of cold rolled mild steel of a sufficient gauge having yield strength of not less than 36,000 p.s.i..

The pole shall be provided with a hand hole and grounding lug attachment at the elevation shown on the standard drawings.

The pole shall have a cable entry slot sized and located as shown on the standard drawings. The slot shall be free of burrs and sharp edges.

6.2 Design (Poles SL-6 and SL-8):

Poles shall be designed at the top to support 200 lbs. tension pulling directly under the street light and shall support a 50 lb. luminaries on a 6□-0□ arm 2□-0□ above the top of the pole with a 3 sq. ft. area. Pole shall be capable of withstanding an 80-MPH windload per AASHTO specifications. Steel or aluminum poles are acceptable.

After fabrication, the pole shall be sandblasted to remove all loose scale, rust, corrosion products, grease, dirt, and other foreign products.

6.3 Design (Pole SL-10):

The height and reach of all poles shall correspond to the dimensions of Detail SL-10.

Poles shall be designed to support the weight of the luminaries and withstand an 80-MPH windload per AASHTO specifications. The pole manufacturer shall provide structural calculations and a certificate of compliance to the specifications.

Pole shafts shall be steel of 48,000 p.s.i. minimum yield after fabrication. All pipes shall be ASTM A-53 grade "B", anchor bolts ASTM 1-307, and base plate and flanges ASTM A-36.

6.4 Design (Pole SL-16):

The height and reach of all poles shall correspond to the dimensions of Detail SL-16.

Poles shall be designed to support the weight of the luminaries and withstand an 80-MPH windload per AASHTO specifications. The pole manufacturer shall provide structural calculations and a certificate of compliance to the specifications.

Pole shafts shall be steel of 48,000 p.s.i. minimum yield after fabrication. All pipes shall be ASTM A-53 grade "B", anchor bolts ASTM 1-307, and base plate and flanges ASTM A-36.

6.5 Design (Pole SL-17):

The height and reach of all poles shall correspond to the dimensions of Detail SL-17.

Poles shall be designed to support the weight of the luminaries and withstand an 80-MPH windload per AASHTO specifications. The pole manufacturer shall provide structural calculations and a certificate of compliance to the specifications.

Pole shafts shall be steel of 48,000 p.s.i. minimum yield after fabrication. All pipes shall be ASTM A-53 grade "B", anchor bolts ASTM 1-307, and base plate and flanges ASTM A-36.

SECTION 7 - POLE PREPARATION, PAINTING AND IDENTIFICATION

7.1 Pole SL-16, SL-17:

After fabrication, the steel poles shall be sandblasted, primed and painted. Sandblasting shall be in accordance with SSPC Specification SP-6-63. This shall be followed with a prime coat of paint within 24 hours. The prime coat of paint shall be compatible with the finish coat of paint. Do not paint over dirt, rust, scale, grease, moisture or conditions otherwise detrimental to formation of a durable paint film. An approved paint shall be used for the finish coat (see Section 8.2). The color shall be a Dark Bronze equal to Val Spar V40-07.

7.2 Pole SL-10:

Interior of poles shall be coated with a high solids epoxy coating. Exterior surfaces shall be blasted to white metal per SSPC-SP7. After blasting, exterior surfaces shall be coated with a 5 mil. dry film thickness of an inorganic-zinc coating. Exterior surfaces shall then be coated with 5 mil. dry film thickness of an alphatic polyurethane coating. The color of the finish coat shall be Park Green (Sherwin Williams F78XXG27314387). An approved paint shall be used for the finish coat (see Section 8.2).

7.3 Poles SL-1, SL-1A, SL-6, SL-8:

After sandblasting, the pole shall be galvanized. The galvanizing shall conform to ASTM A123, latest edition. Zinc (hot galvanized) coating shall be applied on products fabricated from rolled, pressed and forged steels, plates, bars and strip.

7.4 Luminaries and Existing Poles

Replacement and previously painted poles shall be painted as described in Section 7.1, 7.2, and 7.3, except when existing pole is Light Gray. Pole shall then be painted to match ASA 61 Light Gray (equal to Sherwin Williams Polane B Gray, No. F6A31).

7.5 Pole Identification

APS: Contractor to install self-adhesive day and night 1" x 1-1/2" black on yellow background stickers. Stickers to be mounted vertically a minimum of 6'-0" from ground. Numbers to be oriented such as to face oncoming traffic. APS to issue numbers in drawing.

SRP:

1. Installing crew is to number streetlight or dusk to dawn poles at time of installation. Streetlight or dusk to dawn number will be indicated on the work order sketch.

2. Streetlight number is to be placed on side of pole facing street. Dusk to dawn number is to be placed in the most visible location. The identification numbers are to be 6'-0" above finish grade.

3. Surfaces to which numbers are applied must be clean and free of dirt. Numbers for wood poles are to be applied to plastic I.D. plate, which is then to be nailed to pole. Numbers for steel poles are to be applied directly to steel pole.

4. SRP will install streetlight numbers on customer-owned lighting systems. Numbers will be attached to customer owned steel poles and SRP wood poles, which have joint use attachment of City lights. The number to be

installed is shown on the RAC order or job order and will have CH- as the prefix.

SECTION 8 - APPROVED MANUFACTURERS

8.1 Poles:

A. Poles SL-1, SL-1A, SL-6, SL-8, SL-16 and SL-17
   1. CEM-TEC Corporation
   2. Ameron

B. Pole SL-10
   1. Ameron
   2. Structural Steel Products

8.2 Paint:

A. Pole SL-16; Color: ValSpar V40-07 Dark Bronze or equivalent
   1. Sherwin Williams (Polyurethane Enamel)
   2. Pittsburgh Paint (Pitthane-Acrylic Urethane Enamel)
   3. Val Spar Paint (High Solid -Urethane, 40 series or greater)

B. Pole SL-10; Color: Sherwin Williams F78XXG27314387 Park Green
   1. Any manufacturer as approved in Paragraph 8.2A

C. Pole SL-1 (For maintenance purposes on existing poles)
   Color: ASA 61 Light Gray
   1. Any manufacturer as approved in Paragraph 8.2A

8.3 Conduit:

   1. Carlon
   2. Finn Industries, Inc.

SECTION 9 - WOOD POLES

Existing wood electrical distribution system poles may be used for mounting of streetlights, only if approved by the City Transportation Engineer. Use of these existing wood distribution poles must meet one of the following criteria:

a. Reduce the pole-forest effect.

b. Where there is no other choice and only exceptional cases.

Luminaries mounted on existing wood distribution poles shall be furnished and installed by the utility company owning said distribution line, regardless of previously delineated service areas. The developer shall coordinate the design and installation of the luminaries in these areas and shall pay the "Investment By Others" (IBO) costs to the appropriate utility (APS and SRP have standard IBO rates). The developer is not permitted to climb on or attach to these utility company poles. The City shall own the newly installed luminaries.

SECTION 10 - JUNCTION BOXES

10.1 Installation:

A. All junction boxes shall be installed at finish grade.
B. All junction boxes shall be installed adjacent to each pole per detail SL-14A.

10.2 SRP Service Area Junction Box:

The following is referenced for installation purposes. SRP will supply all necessary junction boxes for new streetlights. All J-boxes shall be placed within 3 feet of streetlight pole and should be located in the public utility easement where available.

Junction box shall be constructed of Polymer Concrete or High Density Polyethylene (HDPE) material with a flush mounted bolt-on composite lid. The box shall be constructed so as to be fire retardant. No wood components, or other materials, which can be damaged by water or insects, shall be permitted. The color of the lid shall be gray with the word "STREET LIGHTING" on it. Dimensions of the box shall be approximately 21" x 15" x 12". The lid shall be set inside the top flange and secured in place with a minimum of one recessed 3/8" Penta Head bolt. The Penta Head bolt shall have 0.56" flats per ANSI C57-1226. Box dimensions shown are approximate. Engineering approval of actual dimensions is required prior to the first purchase only. This junction box shall be per SRP Specification UVJB4. Refer to SRP electrical plans to ensure no restrictions or changes have occurred. Refer to detail SL-14C.

10.3 APS Service Area Junction Box:

The following is referenced for installation purposes. APS will supply all necessary junction boxes for new streetlights.

10' x 15" APS Junction Box:

Junction box shall be constructed of a fiberglass or equal material. The outer coating of the material shall be capable of withstanding abrasion and sunlight and shall be impact resistant. The entire box shall be capable of continued water immersion for a prolonged period, with no structural degradation or visual blemishes. The box shall be constructed so as to be fire retardant. No wood components, or other material, which can be damaged by water or insects, etc., shall be permitted. Samples of each new type of box, or an existing box, which has had a design change, shall be supplied to the City for testing. The color of the box shall be forest green or black with a green structural plastic lid. Approximate dimensions shall be such that a minimum opening of 11-3/4" x 17" will exist when the lid has been removed. The lid shall be set inside the top flange and marked "STREET LIGHTING". The lid shall be secured in place with a minimum of one recessed 3/8" Penta Head bolts. The Penta Head bolt shall have 0.56" flats per ANSI C57-1226. Box dimensions shown are approximate. Engineering approval of actual dimensions is required prior to the first purchase only. Two fuse holders are required by APS, one in pole and one in junction box. Refer to detail SL-15.

14" x 24" APS Junction Box:

Junction box shall follow the same requirements as 10" x 15" APS junction box except minimum opening shall be 14" x 24" when lid has been removed. Refer to detail SL-14B.

SECTION 11 - CONDUCTORS

11.1 Conductors shall be No. 12 AWG solid soft-drawn copper and bear the UL label except for green grounding. Green ground shall be No. 8 AWG. Insulation shall be type THWN. The following wire color code shall be used:

Black - 120V power
Black & Red - 240V Power
White - Neutral
Green - Grounding

11.2 Conductors for each luminary shall be connected to the luminaries and extended down the pole. Terminate conductors in all areas at pullbox adjacent to pole per Detail SL-15. Connectors shall be made as stipulated in Section 16.

11.3 It is mandatory that the power conductor for each luminary be fused using Bussman No. HEB-AA in-line, waterproof fuse holders. Install the fuse holders inside the pullbox and install Bussman KTK fuses as shown on Detail SL-15.

SECTION 12 - POLE BASES

12.1 CONCRETE

Concrete bases are required for all streetlights. Concrete for pole foundations shall be Class A (3000#) and conform to Section 725 of the Uniform Standard Specifications for Public Works construction (MAG Specifications).

12.2 DIRECT BURY

When poles are located outside of grass areas, coarse-grained soil areas (more than 50% of the material larger than the No. 200 sieve as defined by the Unified Soil Classification System), or outside the spray radius of a sprinkler head, direct bury poles may be used with the written approval of the City Transportation Engineer. The developer is required to provide a written letter agreeing to these requirements. These requirements shall be placed in the final plat and in the HOA covenants, conditions, & restrictions.

PVC tubes are to be used on pole types SL-1, SL-1A, SL-6, SL-8 and SL-16 installations. If specially designed poles are to be used, pole foundations shall be designed for each specific installation type. See Detail SL-3E for PVC tube installation. Pea gravel shall be 1/4" washed and conform to MAG Specification 701.

12.3. REINFORCING STEEL

Reinforcing Steel for concrete foundations shall conform to grade 60 requirements of Section 727 of the Uniform Standard Specifications for Public Works construction (MAG Specifications).

SECTION 13 - TRENCHING AND BACKFILL

13.1 SRP SERVICE AREA

A. Refer to Detail SL-18.

B. Trenching:

Conduit located in trenches shall have a minimum cover of 36" below finished grade and a minimum width of 8". Bottom of trench must be smooth, flat and without surface irregularities.

C. Backfill:

The first 4" of backfill must be select material consisting of no sharp rocks, no rocks larger than 3/8" and the ratio of rock to soil is not to exceed 1 part in 3. When the native backfill does not meet the requirements, a sand cushion 4" in depth shall be installed. Backfill shall not be performed without approval of SRP.

D. Compaction:

All trenching shall be compacted to a density of 90% of standard Proctor per MAG Spec. Section 601.4.4, type 1.

13.2 APS SERVICE AREA

A. Refer to Detail SL-19.

B. Trenching:

Trenches shall have a minimum width of 4" and a minimum cover over conduit of 24". When crossing streets, a 36" minimum cover is required. However, if conduit is to be installed shallower than 36", the conduit shall be partially encased with a minimum of 4" concrete cover, and 2" on the sides, making the minimum trench width 7". When this encasement rule is applied, the conduit shall have a minimum cover of 24" from final grade. Bottom of trench must be smooth, flat, without surface irregularities and free of debris and organic materials. Developer shall be responsible to assure that trench and backfill meet current APS requirements.

C. Backfill:

Bedding and shade must be able to pass 100% through a 3/8" sieve, 80% through a #4 sieve, and 60% through a #10 sieve. 6" of level bedding shall be placed in the trench topped by 8" of shade. Backfill shall not be performed without approval of APS.

D. Compaction:

At least 6" of select material must be placed over the facility before tamping. Acceptable compaction methods are handtamping with pneumatic or vibrating equipment, and water jetting or flooding in accord with MAG Specs. Section 601.4.5 Compact backfill to a density of 90% of standard Proctor MAG Spec Section 601.4.4, type 1.

Note: ***Trenching requirements are reproduced here for reference only. Developer shall coordinate trenching requirements with the appropriate utility company.***

SECTION 14 - CONDUIT

Conduit shall be installed between poles and junction boxes in all areas as shown on Details SL-12 and SL-15. Conduit required for street, alley or driveway crossings should be 2-1/2", schedule 40 polyvinyl chloride for all installations.

Conduit runs between streetlight pole and junction box shall be 1-inch. The conduit shall be either 1-inch schedule 40 polyvinyl chloride or liquidtight flexible nonmetallic conduit that confirms to the installation and use specifications set forth in the 1997 National Electric Code, section 351. The flexible conduit shall not be used under the following conditions:

1. Where subject to physical damage;
2. Where any combination of ambient and conductor temperatures is in excess of that for which the liquidtight flexible nonmetallic conduit is approved;
3. In lengths longer than 6 feet;
4. Where voltage of conductors is in excess of 600 volts, nominal.

Refer to section 351 of the 1997 National Electric Code for additional criteria on installation and materials for liquidtight flexible nonmetallic conduit.

SECTION 15 - TRAFFIC CONTROL

The Contractor or the utility company is responsible for providing work zone traffic control in accordance with City of Chandler Traffic Barricade Manual.

SECTION 16 - STREETLIGHT ENERGIZATION FOR SUBDIVISIONS IN SRP AREA

The purpose of this procedure is to ensure timely energization of streetlights within subdivisions in the SRP service area.

The Public Works Engineer in charge of Construction Management will be responsible for adherence to this procedure.

The streetlight energization procedure is separated into three primary areas of responsibility: that of the City of Chandler, the Developer/electrical Contractor, and the Salt River Project.

CITY OF CHANDLER:

1. The City will review and approve the proposed streetlight plans.
2. The City will return the approved plans (two sets) along with a letter of authorization and a streetlight energization request to the Developer.
3. The City authorizes SRP to begin streetlight energy billing after completion of the job order.

DEVELOPER/CONTRACTOR:

1. The Developer shall coordinate all project activities with the utilities in the area including submittal of approved streetlight plans, civil plans, authorization letter to bill the City, and the energization request form previously submitted to the Developer.

2. The Contractor will install all the streetlights as shown in the approved job plan.

3. The Contractor will install junction boxes in accordance with Section 10 and Detail SL-14A.

4. The Contractor shall affix a streetlight number on each pole as shown on the job order plan prior to final inspection according to Detail SL-3B.

5. Within new subdivisions in the SRP area, the Contractor will connect and energize each streetlight in the junction box utilizing the connectors in place as shown on Detail SL-15. In all other cases, the connection will be made by servicing utility company.

6. The Developer will pay to the City at the time a permit is issued an energization fee to be collected by SRP in the amount as established by the City's permit fee schedule per streetlight.

SALT RIVER PROJECT:

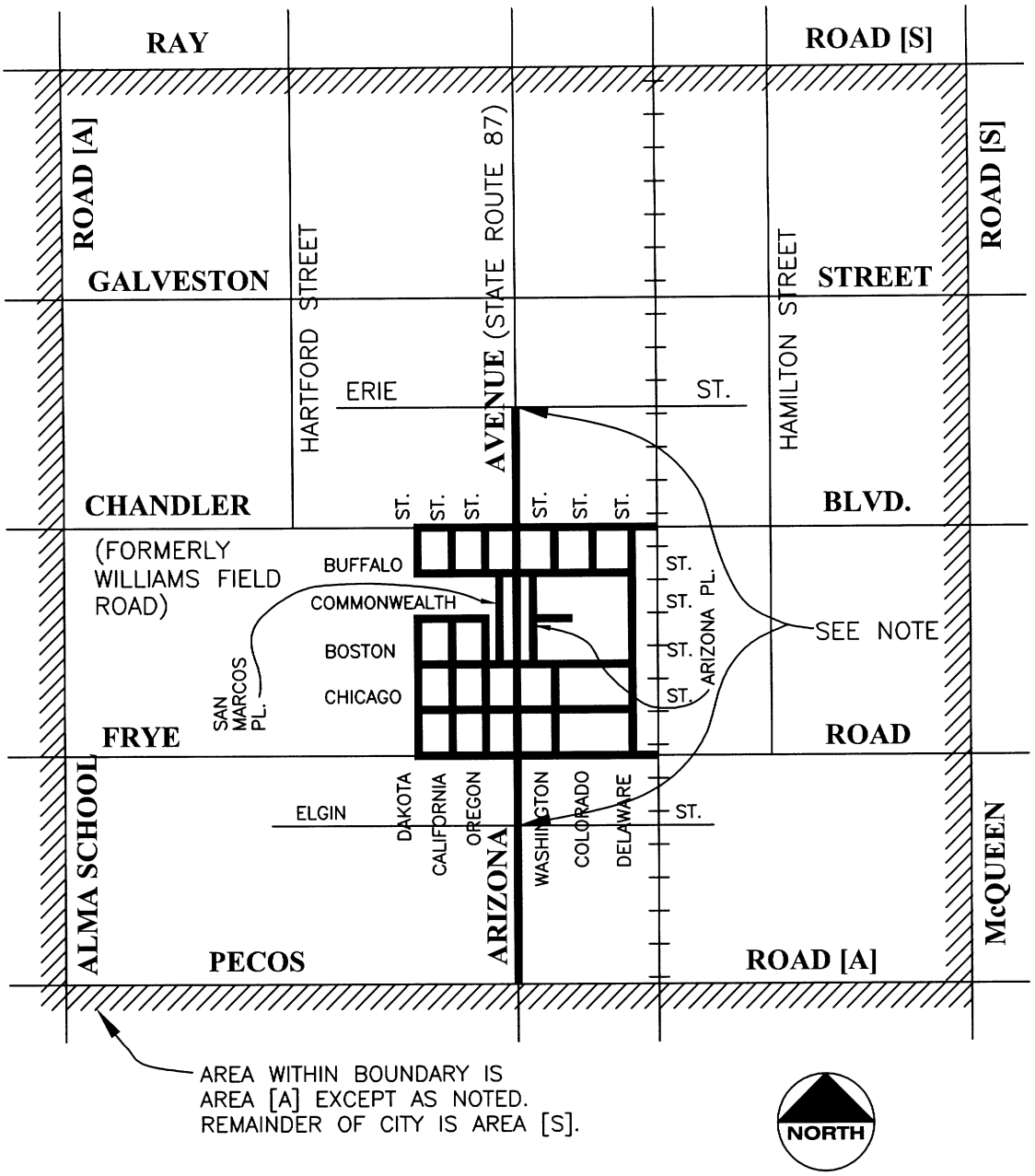
1. SRP will initiate design of a job order plan to serve a new development when a letter of authorization, approved civil plans and approved streetlight layout have been received.

2. SRP will inspect and coordinate the trenching detail and underground conduit requirement for the primary and secondary conductors.

3. SRP will schedule construction crews to install transformers, pull wire, terminate and energize all conductor cables following receipt of the corresponding recorded subdivision plat.

4. SRP will add installed and/or planned streetlight units for the subdivision to the City of Chandler monthly lighting service bill after completion of the job order work at the site.

5. SRP will establish an energization fee for each streetlight connected by a Developer electrician. SRP will invoice the City upon completion of the SRP job order.



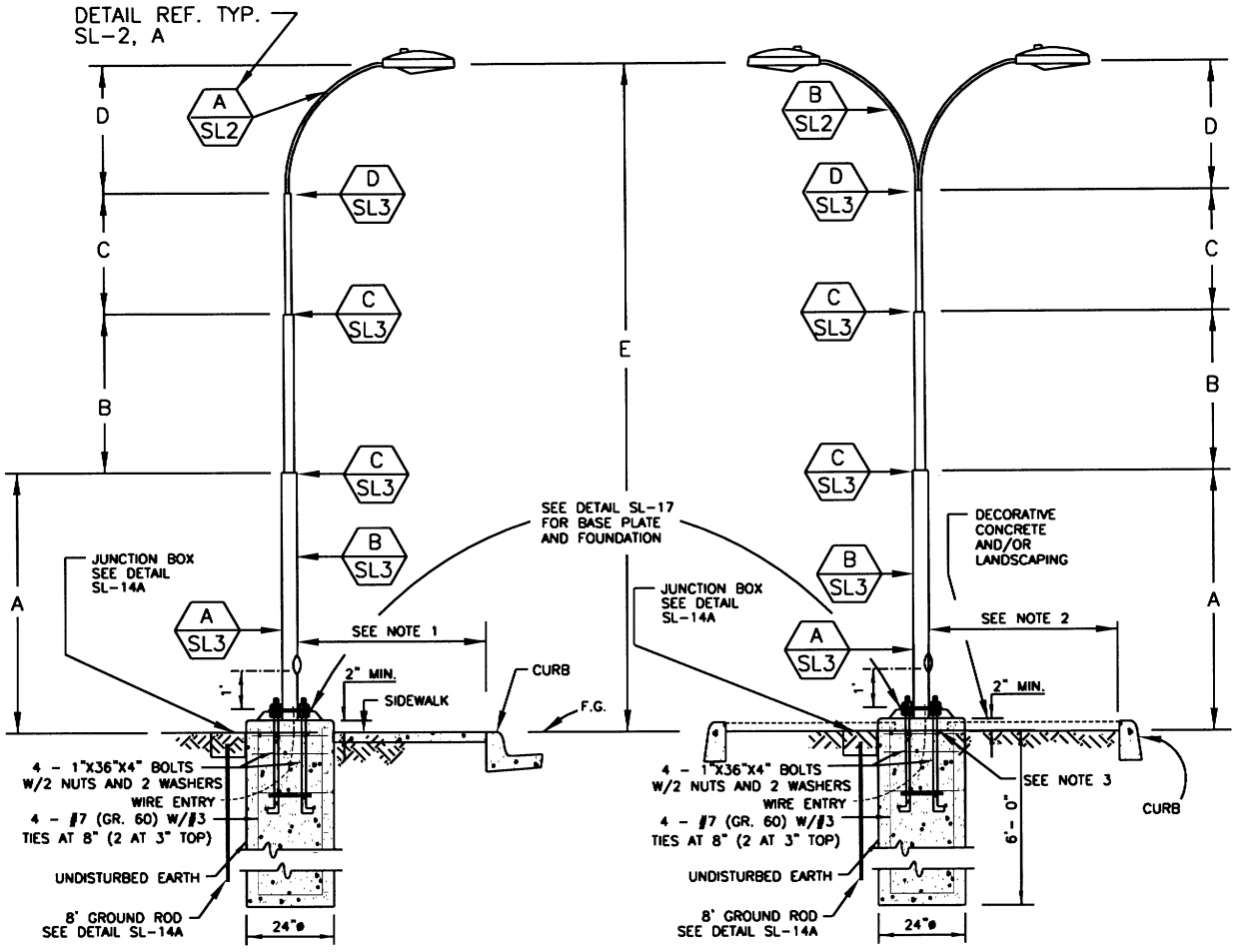
NOTE:

HEAVY LINES INDICATE STREETS OF AREA [C] USING SPECIAL CITY CENTER STREET LIGHTS. PLANS FOR STREET LIGHTS IN AREA [C] SHALL BE SUBJECT TO APPROVAL OF THE CITY'S PLANNING DEPT. FOR COMPLIANCE WITH THE DOWNTOWN REDEVELOPMENT OBJECTIVES.

City of Chandler Chandler + Arizona	**DELINEATION OF AREAS** Street Light Standard	DETAIL NO. **SL-A** NTS

SINGLE DAVIT ARM

DOUBLE DAVIT ARM



STREET TYPE	DESCRIPTION	POLE	A	B	C	D	E
LOCAL	100W, 9500 LUMEN, HPS	SINGLE	11.5'	8'-0"	6'-0"	4'-6"	30'-0"
LOCAL WITH MEDIAN	100W, 9500 LUMEN, HPS	DOUBLE	11.5'	8'-0"	6'-0"	4'-6"	30'-0"
MINOR COLLECTOR W/O MEDIAN	150W, 16,000 LUMEN, HPS	SINGLE	13.5'	9'-6"	5'-6"	7'-0"	35'-6"
MINOR COLLECTOR W/ MEDIAN	150W, 16,000 LUMEN, HPS	DOUBLE	13.5'	9'-6"	5'-6"	7'-0"	35'-6"
ARTERIAL/MAJOR COLLECTOR WITHOUT MEDIAN	250W, 30,000 LUMEN, HPS	SINGLE	13.5'	9'-6"	5'-6"	7'-0"	35'-6"
ARTERIAL/MAJOR COLLECTOR WITH MEDIAN	250W, 30,000 LUMEN, HPS	DOUBLE	13.5'	9'-6"	5'-6"	7'-0"	35'-6"

NOTES:

1. POLE SHALL BE MINIMUM 1' -0" BEHIND SIDEWALK UNLESS OTHERWISE DIRECTED. IN NO CASE WILL THE FACE OF POLE BE LOCATED LESS THAN 2'-6" BEHIND THE BACK OF CURB.
2. POLE SHALL BE MIDWAY BETWEEN CURBS OF THE MEDIAN.
3. DIMENSION 'A' MAY NEED TO BE INCREASED IF GRADE DROPS BELOW CURB LINE.
4. A 2 SECTION TELESCOPIC POLE OF SIMILAR STRENGTH AND HEIGHT WILL ALSO BE ACCEPTED.

City of Chandler
Chandler + Arizona

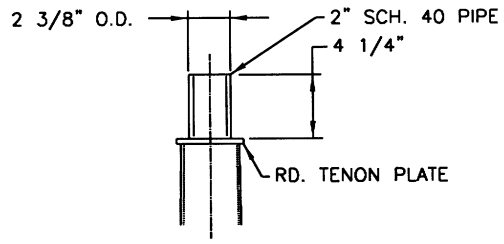
POLE ASSEMBLY

Street Light Standard

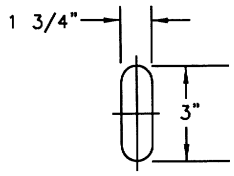
DETAIL NO.

SL-1

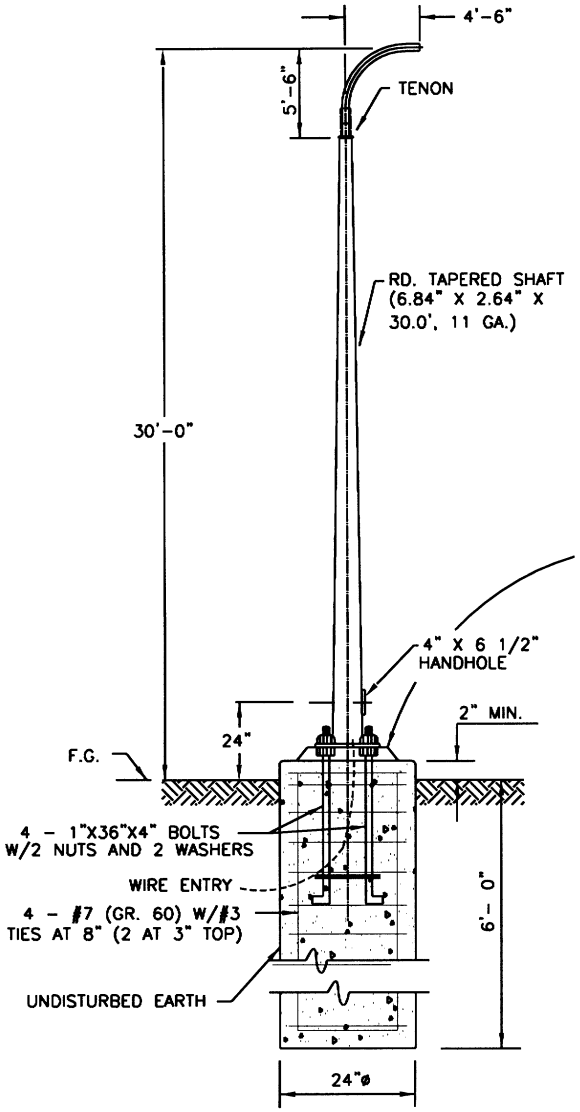
NTS



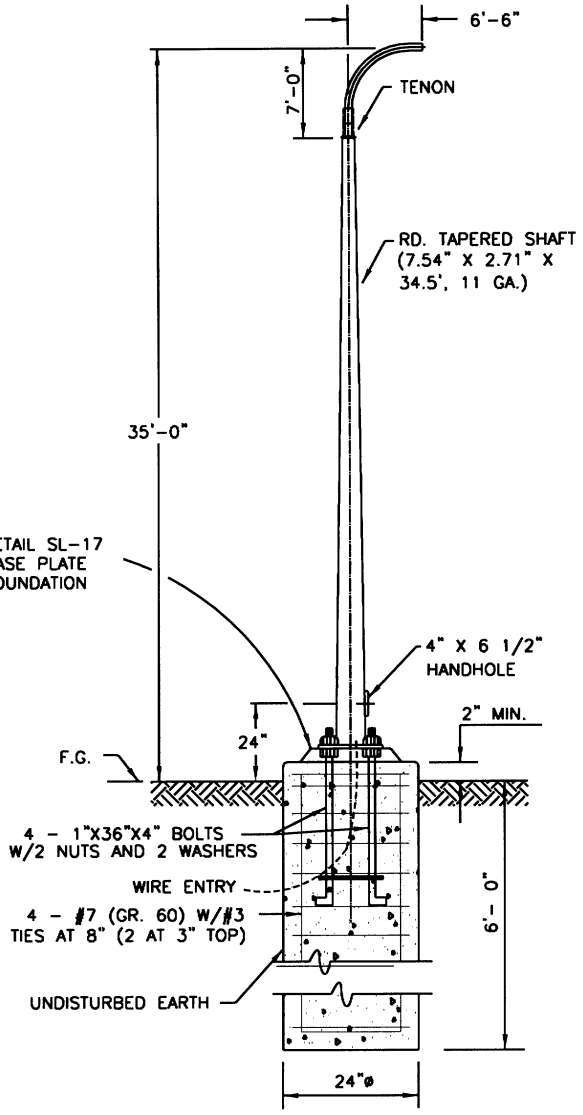
TENON DETAIL



WIREWAY HOLE DETAIL

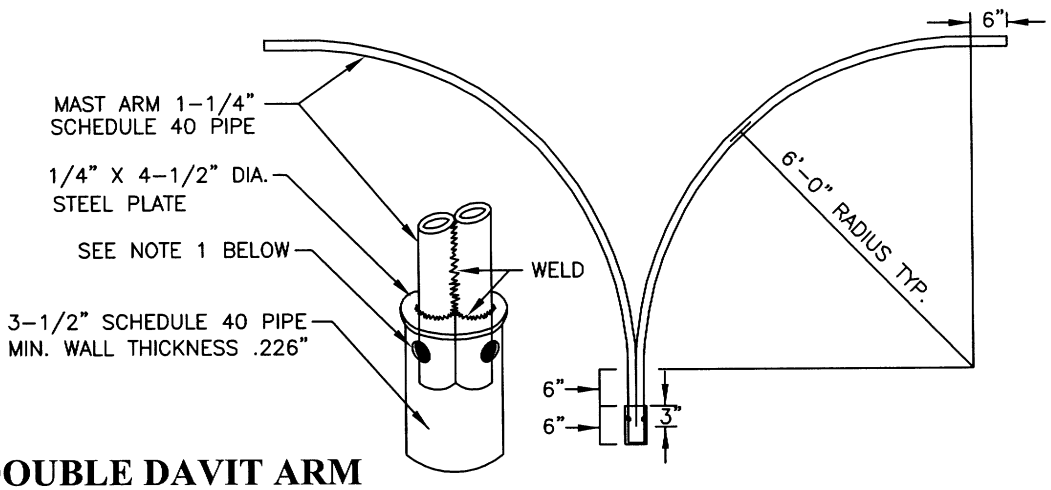


POLE ASSEMBLY WITH
4'-6" DAVIT ARM



POLE ASSEMBLY WITH
6'-6" DAVIT ARM

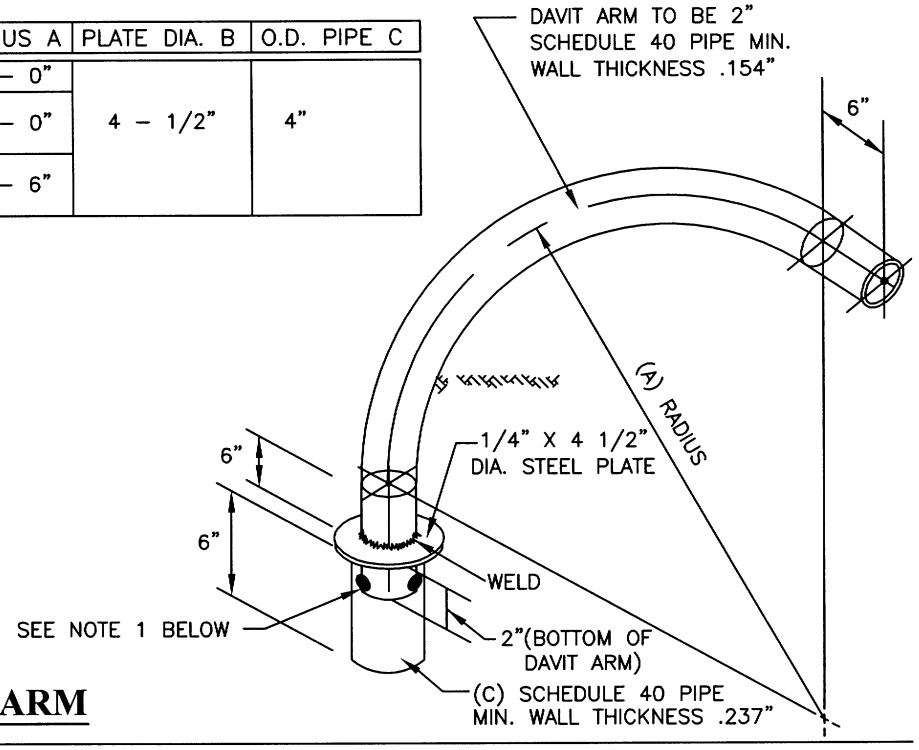
City of Chandler Chandler + Arizona	**POLE ASSEMBLY** Street Light Standard	DETAIL NO. **SL-1A** NTS



DOUBLE DAVIT ARM

B

STREET TYPE	RADIUS A	PLATE DIA. B	O.D. PIPE C
LOCAL	4' - 0"	4 - 1/2"	4"
MINOR COLLECTOR	4' - 0"		
ARTERIAL/MAJOR COLLECTOR	6' - 6"		



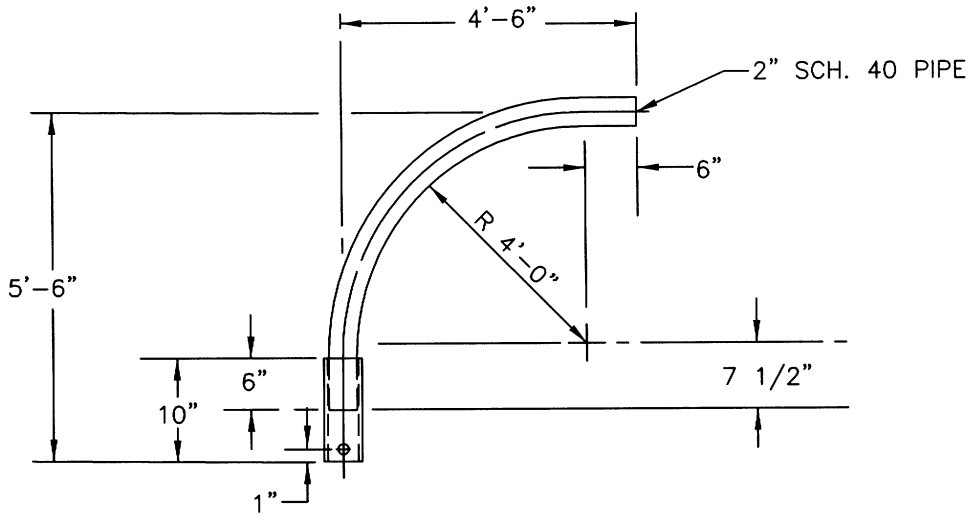
DAVIT ARM

A

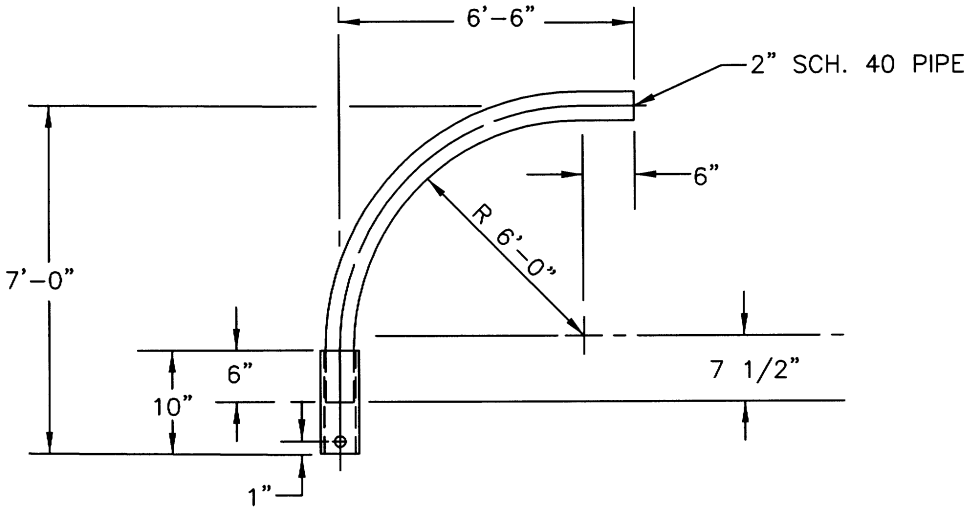
NOTE:

1. THREE HOLES, DRILLED AND TAPPED TO ACCOMODATE 1/2" ALLEN SET SCREWS, SPACED 120° APART HORIZONTALLY AND 1-1/2" BELOW STEEL PLATE. (SEE DETAIL SL-3D)
2. FINISH TO MATCH THAT SPECIFIED FOR THE POLE.

City of Chandler Chandler + Arizona	**DAVIT ARMS (POLE SL-1)** Street Light Standard	DETAIL NO. **SL-2** NTS



4'-6" DAVIT ARM



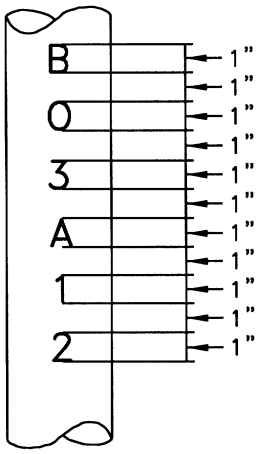
6'-6" DAVIT ARM

NOTES:

(4) 3/8" X 1" SET SCREWS @ 90° APART

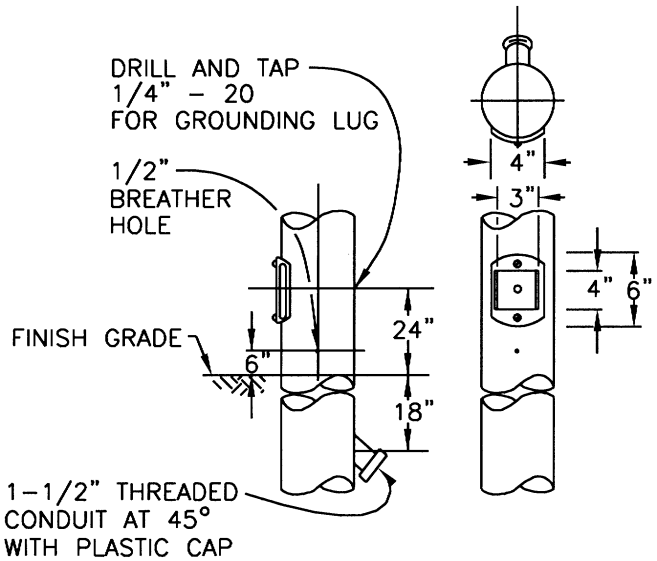
SLIPFITTER FOR 2 3/8" O.D. TENON

City of Chandler Chandler + Arizona	**DAVIT ARMS (POLE SL-1A)** Street Light Standard	DETAIL NO. **SL-2A** NTS

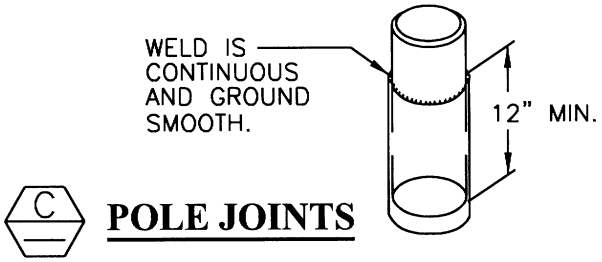


NOTE: REFER TO SECTION 7.5 FOR POLE IDENTIFICATION.

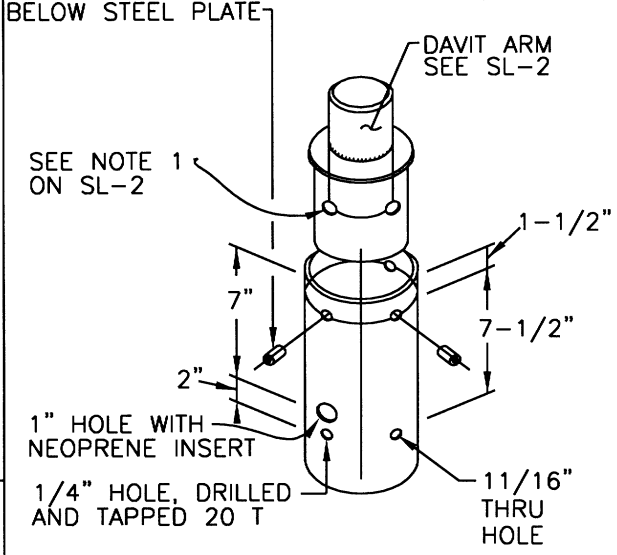
B POLE NUMBER LOCATIONS



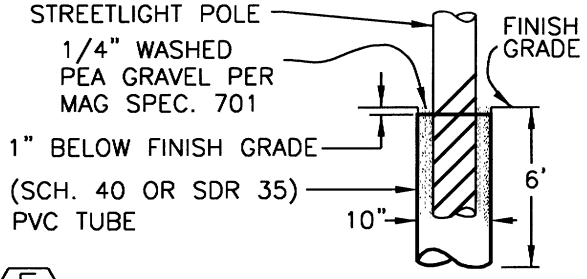
A PENETRATIONS



C POLE JOINTS



D DAVIT ARM CONNECTION



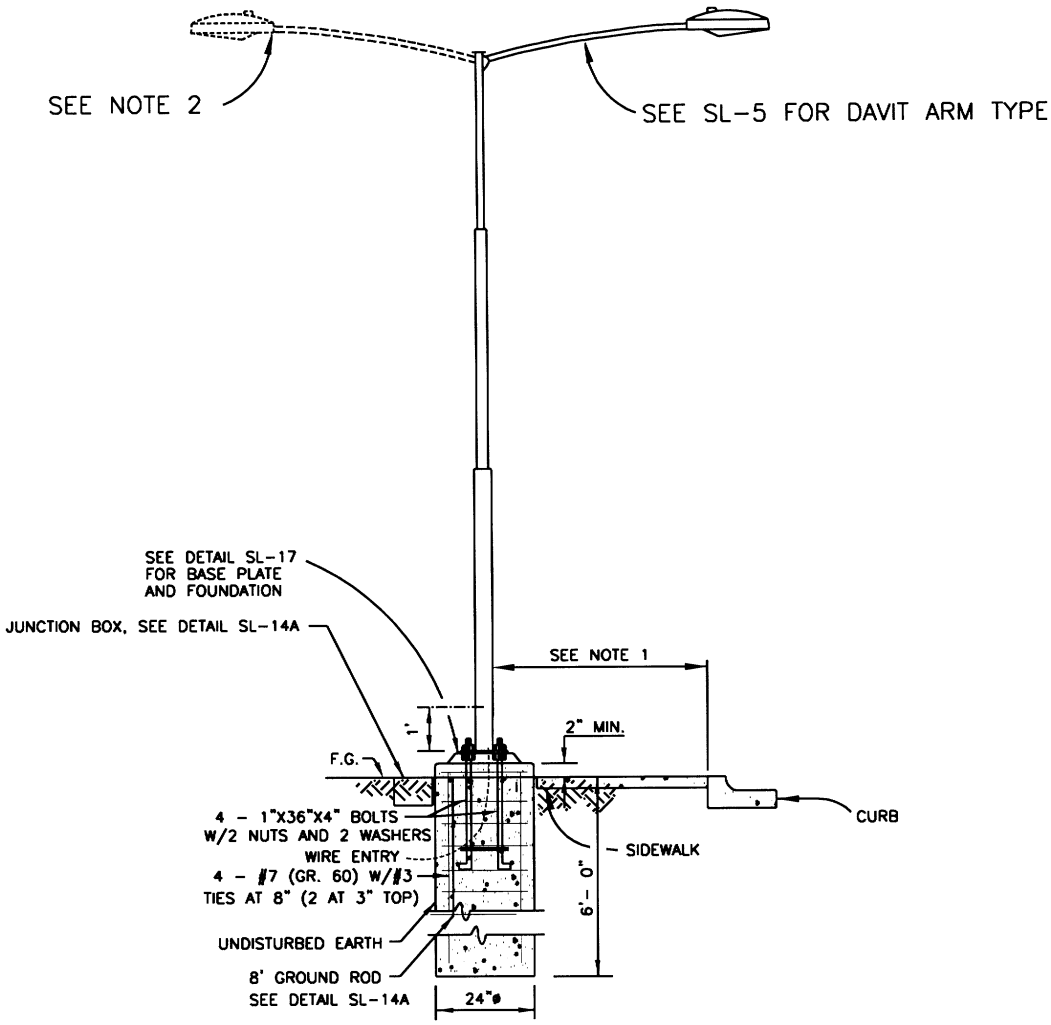
E PVC MOUNTING TUBE

NOTE: AFTER GALVANIZING, THE BOTTOM 5'-6" OF POLE SHALL BE DIPPED OR COATED INSIDE AND OUT WITH A COAL TAR EPOXY 6-8 MILS THICK, WHEN DRY. POLES ARE TO BE WRAPPED WITH 10 MIL THICK CORROSION PROTECTION TAPE (MADE BY 3M OR EQUIVALENT) TO A HEIGHT OF 6" ABOVE FINISH GRADE LINE. IF POLE IS NOT PROPERLY TAPED, POLES SHALL BE PULLED AND RESET AS REQUIRED BY THE ENGINEER. THIS APPLIES TO ANY POLE EXTENDING BELOW GROUND LEVEL.

City of Chandler
Chandler + Arizona

DETAILS
(POLE SL-1)
Street Light Standard

DETAIL NO.
SL-3
A-B-C-D-E
NTS



STREET TYPE	DESCRIPTION	POLE	MAST ARM
LOCAL	100W, 9500 LUMEN, HPS	SL-6	SL-5 DTL. 1
MINOR COLLECTOR	150W, 16,000 LUMEN, HPS	SL-6	SL-5 DTL. 2
LOCAL WITH MEDIAN	100W, 9500 LUMEN, HPS	SL-8	SL-5 DTL. 1
MINOR COLLECTOR WITH MEDIAN	150W, 16,000 LUMEN, HPS	SL-8	SL-5 DTL. 2
ARTERIAL/MAJOR COLLECTOR WITH MEDIAN	250W, 30,000 LUMEN, HPS	SL-8	SL-5 DTL. 3
ARTERIAL/MAJOR COLLECTOR WITHOUT MEDIAN	250W, 30,000 LUMEN, HPS	SL-8	SL-5 DTL. 3

NOTES:

1. POLE SHALL BE MINIMUM 1' – 0" BEHIND SIDEWALK UNLESS OTHERWISE DIRECTED. IN NO CASE SHALL THE FACE OF POLE BE LOCATED LESS THAN 2'–6" BEHIND THE BACK OF CURB.
2. POLE SHALL BE MIDWAY BETWEEN CURBS OF THE MEDIAN WHEN USING DOUBLE DAVIT ARMS.

City of Chandler

Chandler + Arizona

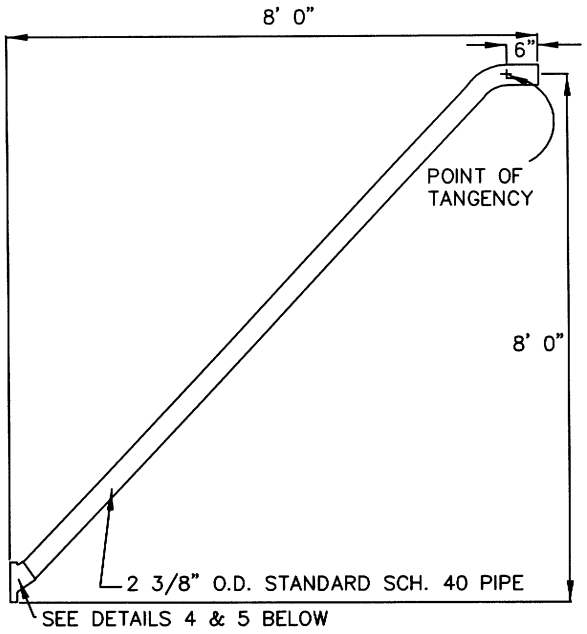
POLE ASSEMBLY (POLES SL-6 AND SL-8)

Street Light Standard

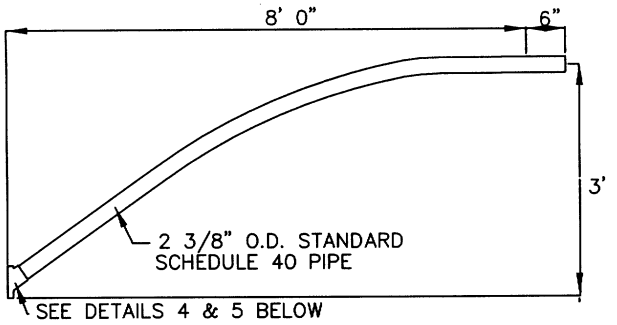
DETAIL NO.

SL-4

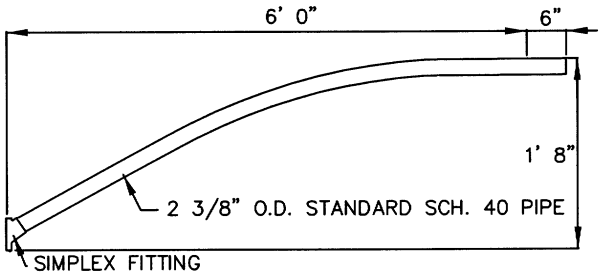
NTS



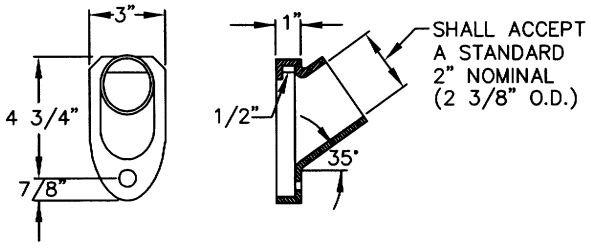
③ ARTERIAL STREETS



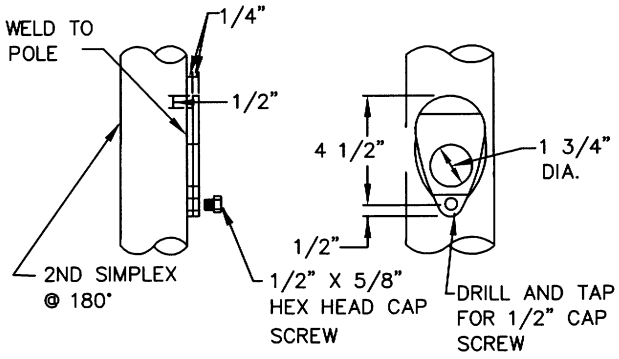
① LOCAL STREETS



② COLLECTOR STREETS



④ FITTING FOOT

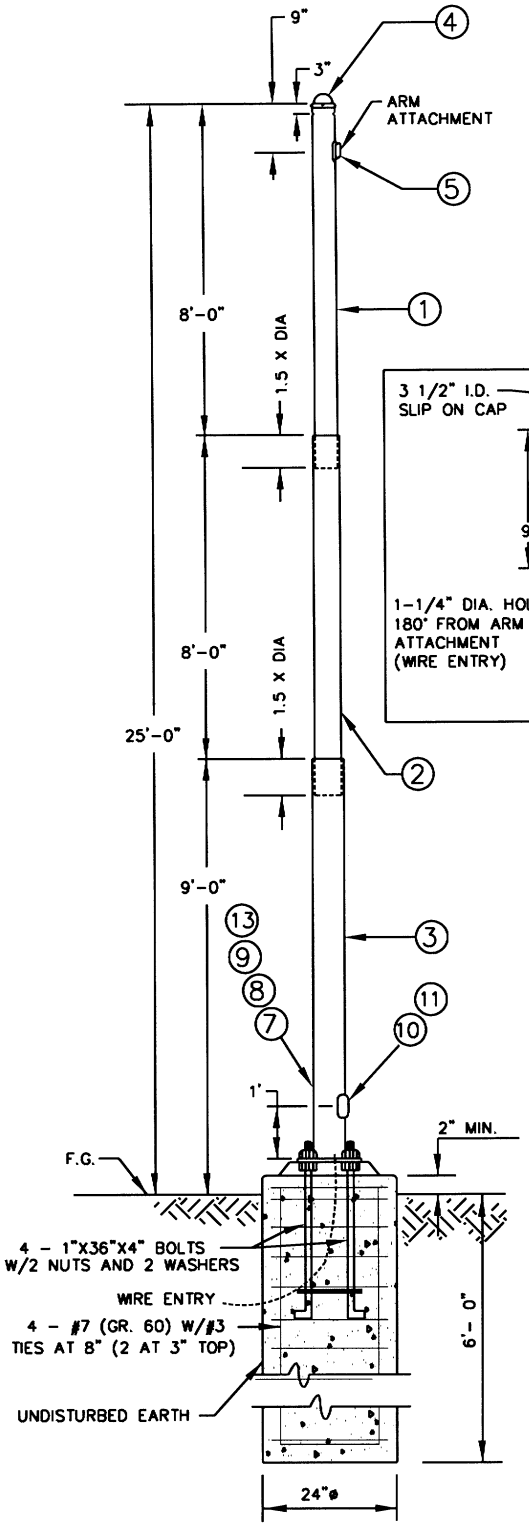


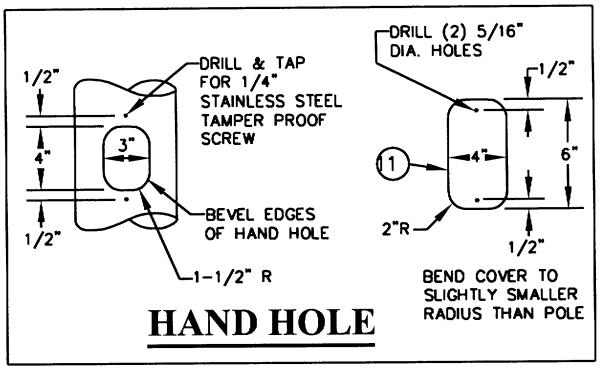
⑤ FITTING SHOE

NOTES:

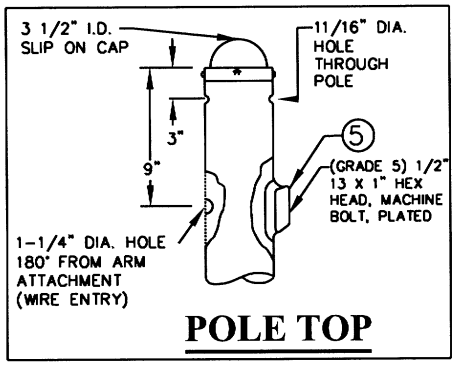
1. REFER TO SECTION 7 FOR POLE FINISH.
2. ANY VARIANCE IN DAVIT ARM OFFSET SHALL BE APPROVED BY CITY ENGINEER PRIOR TO INSTALLATION.

City of Chandler Chandler + Arizona	**DAVIT ARM** **(POLES SL-6 AND SL-8)** Street Light Standard	DETAIL NO. **SL-5** NTS

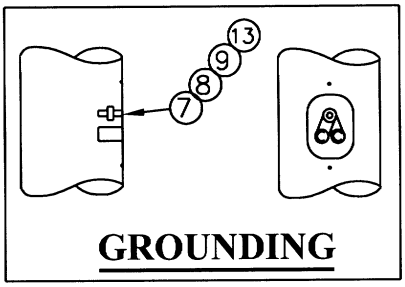




HAND HOLE



POLE TOP



GROUNDING

NOTES:

1. THE HAND HOLE TO BE 4"X3" WITH 1-1/2" RADII. THE HAND HOLE COVER TO BE 4"X6"X16 GAUGE WITH 2" RADII AND BEND TO SLIGHTLY SMALLER RADIUS THAN THE POLE. THE COVER IS TO BE SECURED WITH (2) 1/4" STAINLESS STEEL TAMPER PROOF SCREWS, SUPPLIED BY THE MANUFACTURER.
2. AFTER FABRICATION, THE POLE SHALL BE SANBLASTED TO REMOVE ALL LOOSE SCALE, RUST, CORROSION PRODUCTS, GREASE, DIRT, AND OTHER FOREIGN PRODUCTS.
3. AFTER SANDBLASTING, THE POLE SHALL BE GALVANIZED. THE GALVANIZING SHALL CONFORM WITH ASTM A123, LATEST EDITION. ZINC (HOT GALVANIZED) COATING ON PRODUCTS FABRICATED FROM ROLLED, PRESSED AND FORGED STEELS, PLATES, BARS AND STRIP.
4. POLE SHALL BE DESIGNED AT THE TOP TO SUPPORT 200 LBS. TENSION PULLING DIRECTLY UNDER THE STREET LIGHT AND SHALL SUPPORT A 50 LB LUMINARE ON A 6'-0" ARM 2'-0" ABOVE THE TOP OF THE POLE WITH A 3 SQ. FT. AREA. POLE SHALL ALSO WITHSTAND AN 80 MPH WIND.
5. SEE DETAIL SL-17 FOR BASE PLATE AND FOUNDATION.

REFER TO SL-7 FOR
PART NUMBER DESCRIPTIONS (1) THROUGH (13)

CITY OF CHANDLER
CHANDLER ARIZONA

POLE DETAILS

Street Light Standard

DETAIL NO.

SL-6

NTS

ITEM	QUANTITY	DESCRIPTION
1	1	PIPE, 3–1/2" O.D. 0.109" WALL 8'–6" LONG
2	1	PIPE, 4–1/2" O.D. 0.125" WALL 8'–6" LONG
3	1	PIPE, 5–9/16" O.D. 0.188" WALL 14'–0" LONG
4	1	CAP, 3–1/2" I.D. STANDARD SLIP ON
5	1	SIMPLEX, UNIVERSAL CT–2 PER EM–912
6	1	PIPE, 1–1/2" MIN. I.D. STEEL 3–1/2" LONG
7	2	LUG, TERMINAL (BLACKBURN L70 OR EQUIVALENT)
8	1	BOLT, 1/4" X 3/4" ROUND HEAD – RIBBED SHANKED WITH NUT
9	1	WASHER, 1/4" ROUND
10	2	SCREW, 1/4" STAINLESS STEED TAMPER PROOF
11	1	PLATE, COVER, 16 GA. STEEL
12	1	PLATE, BUTT 4" X 4" X 3/16"
13	1	WASHER, SINGLE COIL LOCK

City of Chandler

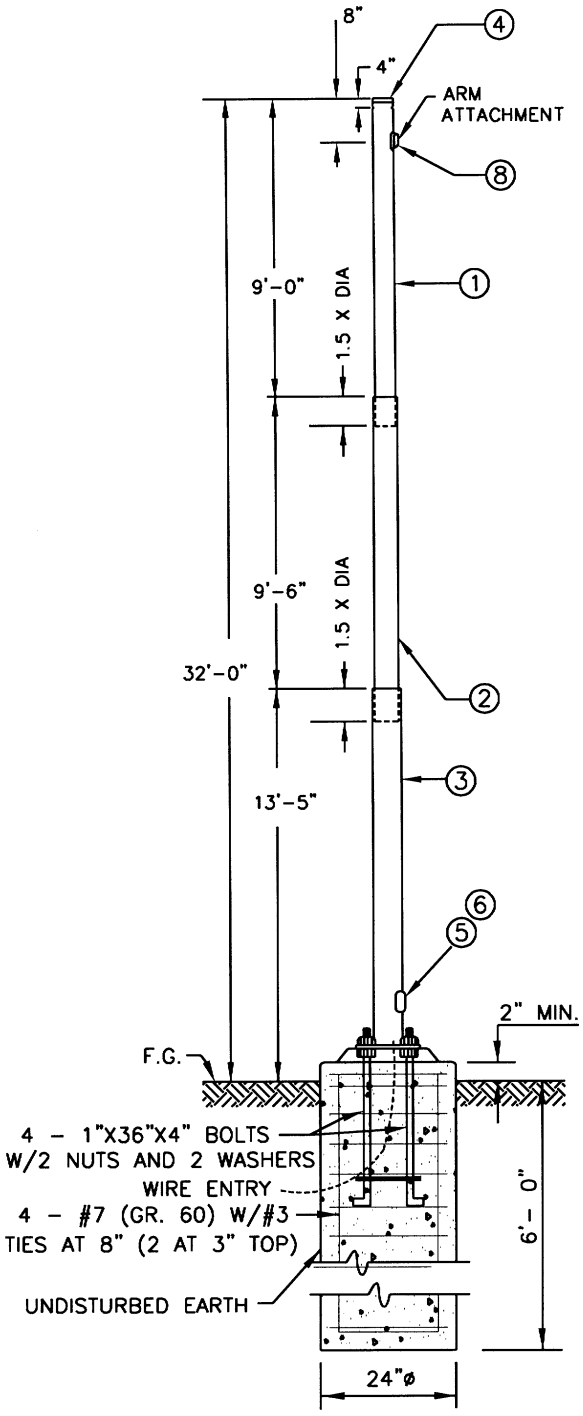
Chandler + Arizona

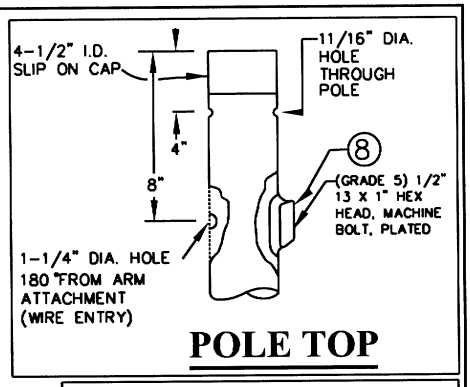
POLE DETAILS
(POLE SL-6)

Street Light Standard

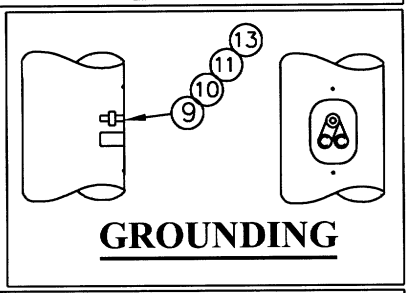
DETAIL NO.

SL-7

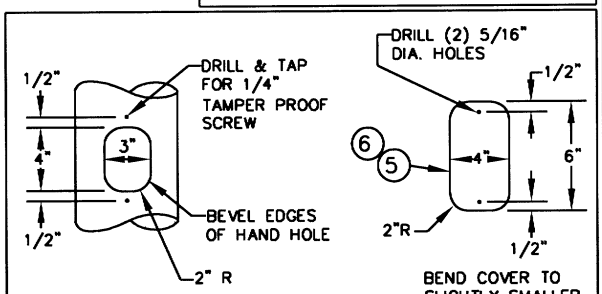




POLE TOP



GROUNDING



HAND HOLE

NOTES:

1. THE HAND HOLE TO BE 4"X3" WITH 1-1/2" RADII. THE HAND HOLE COVER TO BE 4"X6"X16 GAUGE WITH 2" RADII AND BEND TO SLIGHTLY SMALLER RADIUS THAN THE POLE. THE COVER IS TO BE SECURED WITH (2) 1/4" STAINLESS STEEL TAMPER PROOF SCREWS, SUPPLIED BY the manufacturer.
2. AFTER FABRICATION, THE POLE SHALL BE SANDBLASTED TO REMOVE ALL LOOSE SCALE, RUST, CORROSION PRODUCTS, GREASE, DIRT, AND OTHER FOREIGN PRODUCTS.
3. AFTER SANDBLASTING, THE POLE SHALL BE GALVANIZED. THE GALVANIZING SHALL CONFORM WITH ASTM A123, LATEST EDITION. ZINC (HOT GALVANIZED) COATING ON PRODUCTS FABRICATED FROM ROLLED, PRESSED AND FORGED STEELS, PLATES, BARS AND STRIP.
4. POLE SHALL BE DESIGNED AT THE TOP TO SUPPORT 200 LBS. TENSION PULLING DIRECTLY UNDER THE STREET LIGHT AND SHALL SUPPORT A 50 LB LUMINAIRE ON A 6'-0" ARM 2'-0" ABOVE THE TOP OF THE POLE WITH A 3 SQ. FT. AREA. POLE SHALL ALSO WITHSTAND AN 80 MPH WIND.
5. SEE DETAIL SL-17 FOR BASE PLATE AND FOUNDATION.

REFER TO SL-9 FOR PART NUMBER DESCRIPTIONS ① THROUGH ⑬

City of Chandler Chandler + Arizona	**POLE DETAILS** Street Light Standard	DETAIL NO. **SL-8** NTS

ITEM	QUANTITY	DESCRIPTION
1	1	PIPE, 4–1/2" O.D. 0.125" WALL 9'–6" LONG
2	1	PIPE, 5–9/16" O.D. 0.134" WALL 10'–0" LONG
3	1	PIPE, 6–5/8" O.D. 0.188" WALL 20'–0" LONG
4	1	CAP, 4–1/2" I.D. STANDARD SLIP ON
5	1	PLATE, COVER, 16 GA. STEEL
6	1	SCREW, 1/4" STAINLESS STEEL TAMPER PROOF
7	2	PIPE, 1–1/2" MIN. I.D. STEEL 3–1/2"
8	1	SIMPLEX, UNIVERSAL CT–2 PER EM–912
9	1	LUG, TERMINAL (BLACKBURN L70 OR EQUIVALENT)
10	2	BOLT, 1/4" X 3/4" ROUND HEAD–RIBBED SHANKED WITH NUT
11	1	WASHER, 1/4" ROUND
12	1	PLATE, BUTT 4–5/8" X 4–5/8" X 3/16"
13	1	WASHER, SINGLE COIL LOCK

City of Chandler

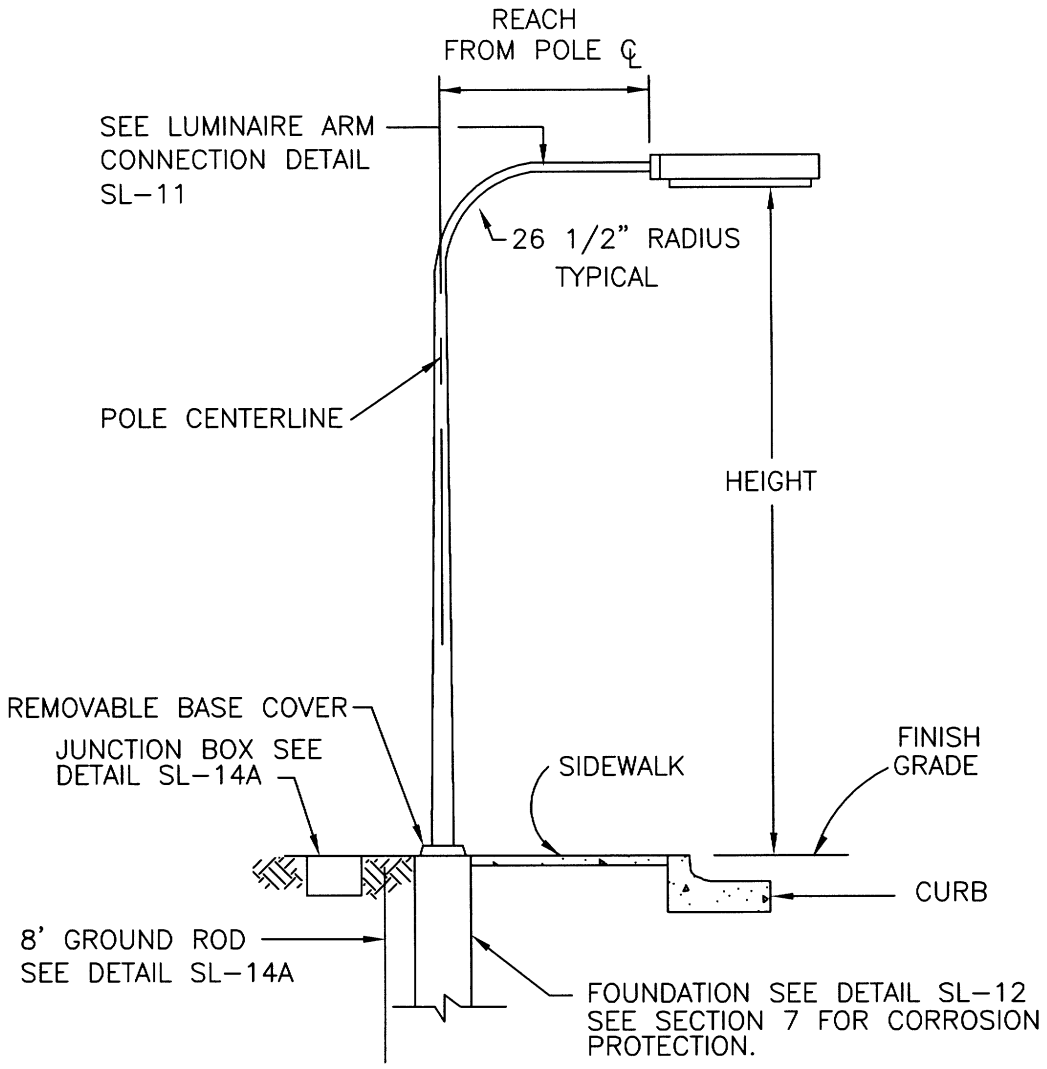
Chandler + Arizona

POLE DETAILS (POLE SL-8)

Street Light Standard

DETAIL NO.

SL-9



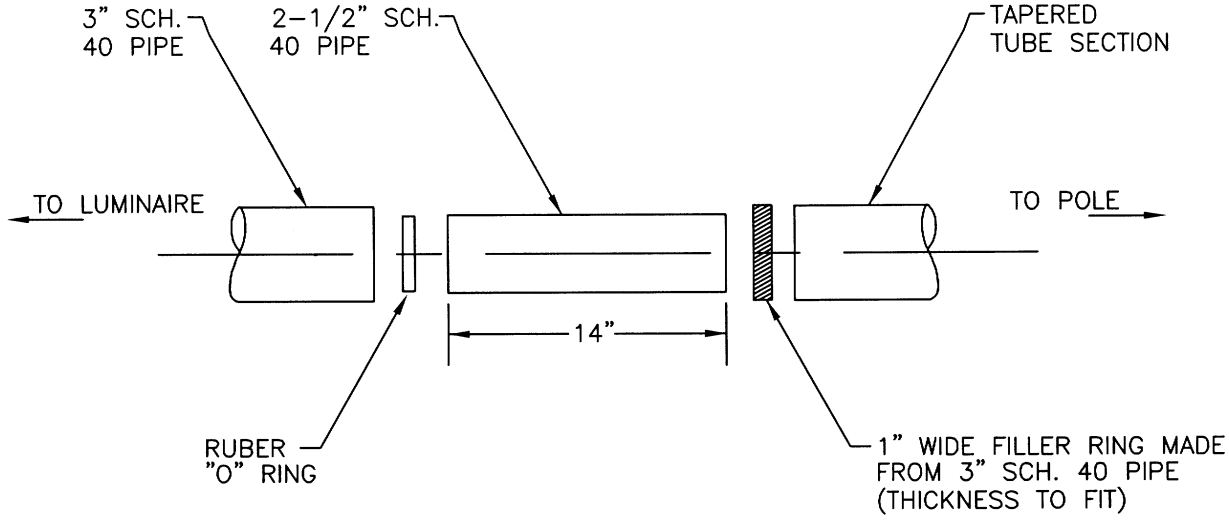
STREET TYPE	DESCRIPTION	HEIGHT	REACH
LOCAL AND COLLECTOR	150W, 16,000 LUMEN, HPS	30'–0"	8'–0"
ARTERIAL	250W, 30,000 LUMEN, HPS	40'–0"	18'–0"

City of Chandler
Chandler + Arizona

POLE ASSEMBLY
CITY CENTER STREET LIGHTS
Street Light Standard

DETAIL NO.
SL-10
NTS

1



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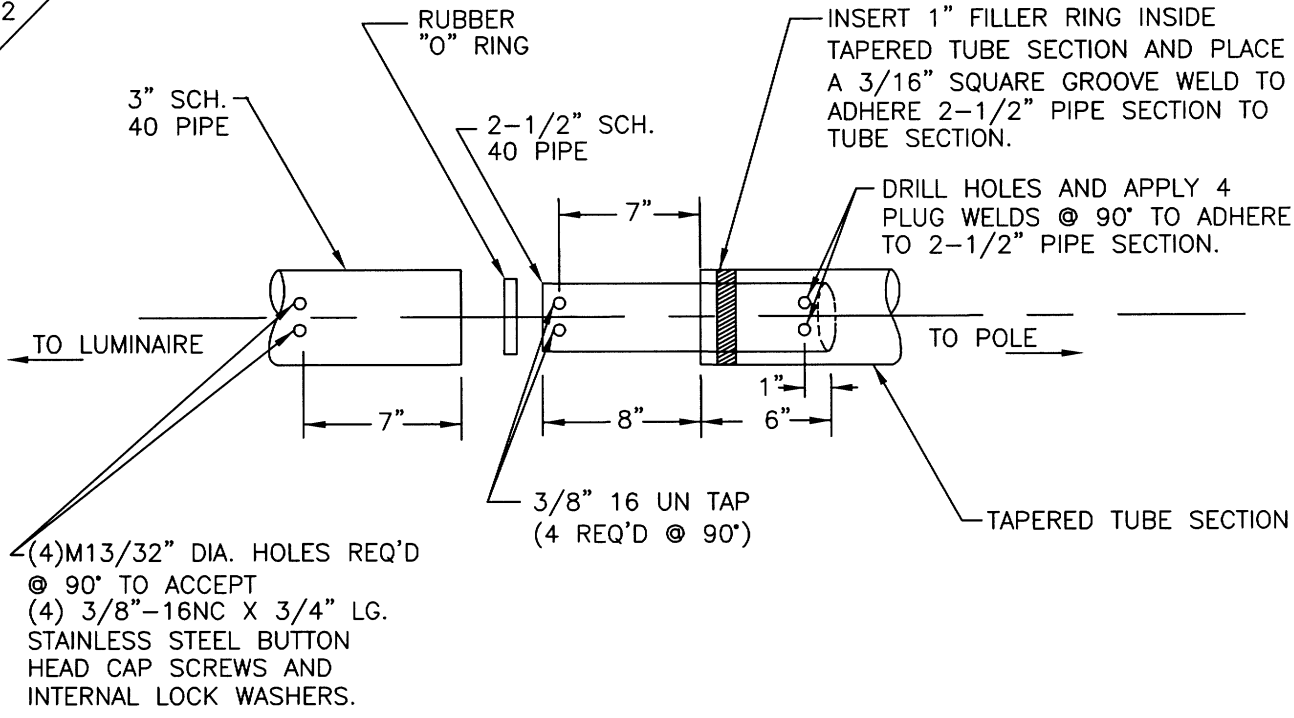


1 CONNECTION-EXPLODED VIEW 2 CONNECTION-WELDED READY TO ASSEMBLE

City of Chandler

Chandler + Arizona

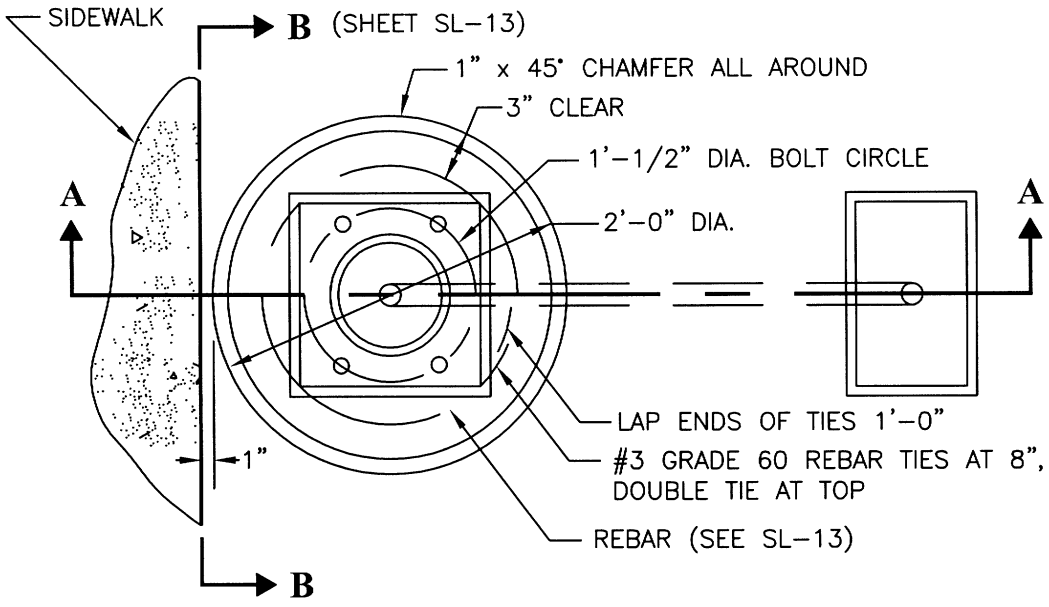
LUMINAIRE ARM CONNECTION DETAIL CITY CENTER STREET LIGHTS

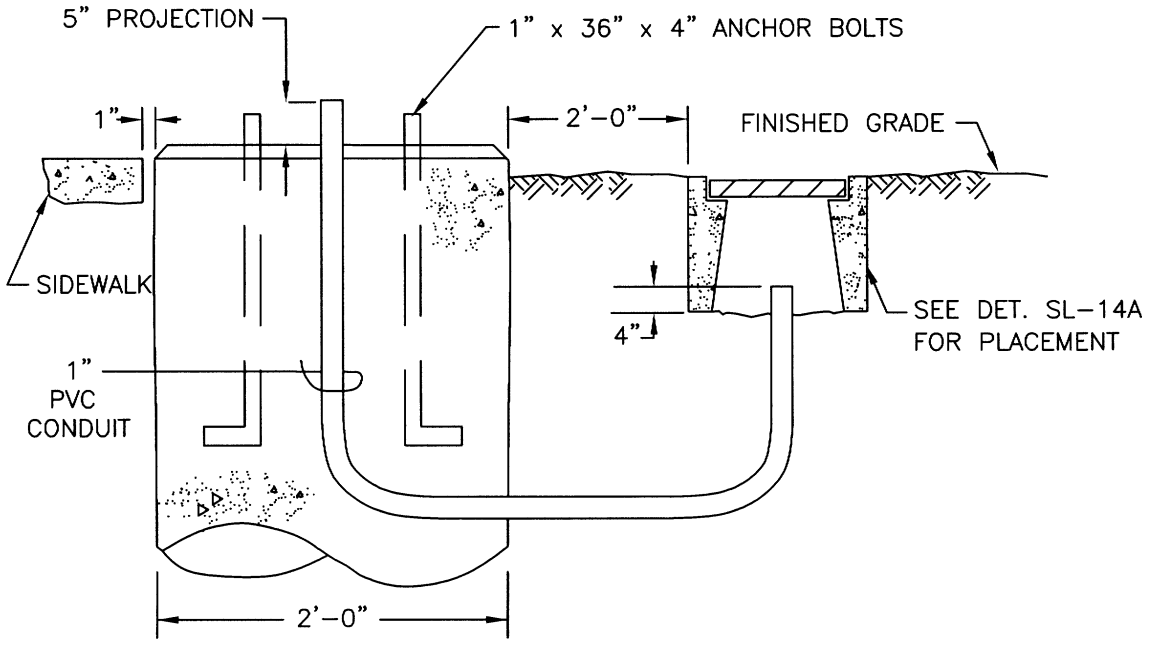
Street Light Standard

DETAIL NO.

SL-11

NTS



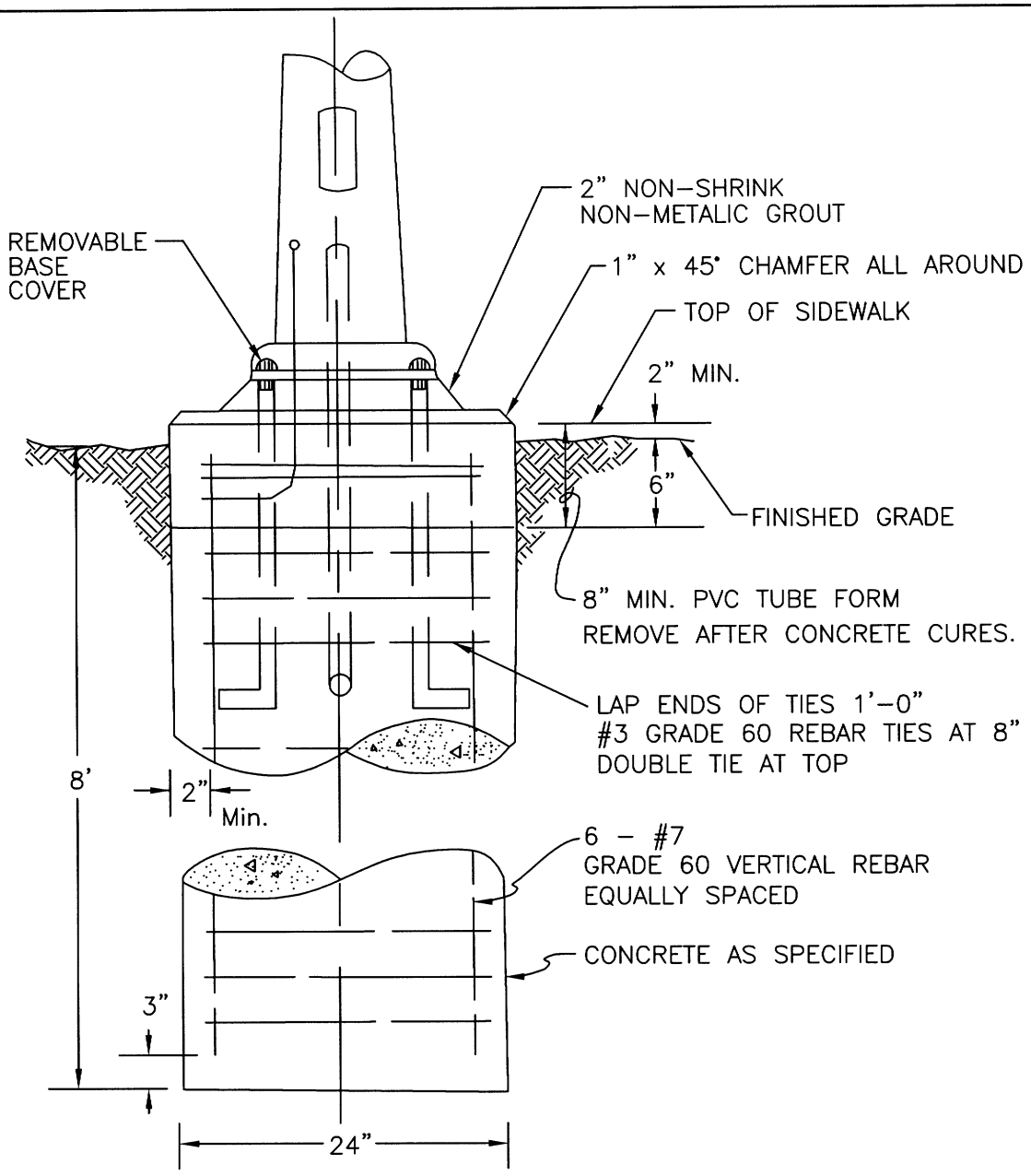


SECTION A-A

NOTE:

THIS FOUNDATION TYPE IS ALSO ACCEPTABLE IN THE OTHER AREAS OF THE CITY WITH THE APPROVAL OF THE CITY ENGINEER.

City of Chandler Chandler + Arizona	**FOUNDATION DETAILS** **CITY CENTER STREET LIGHTS** Street Light Standard	DETAIL NO. **SL-12** NTS

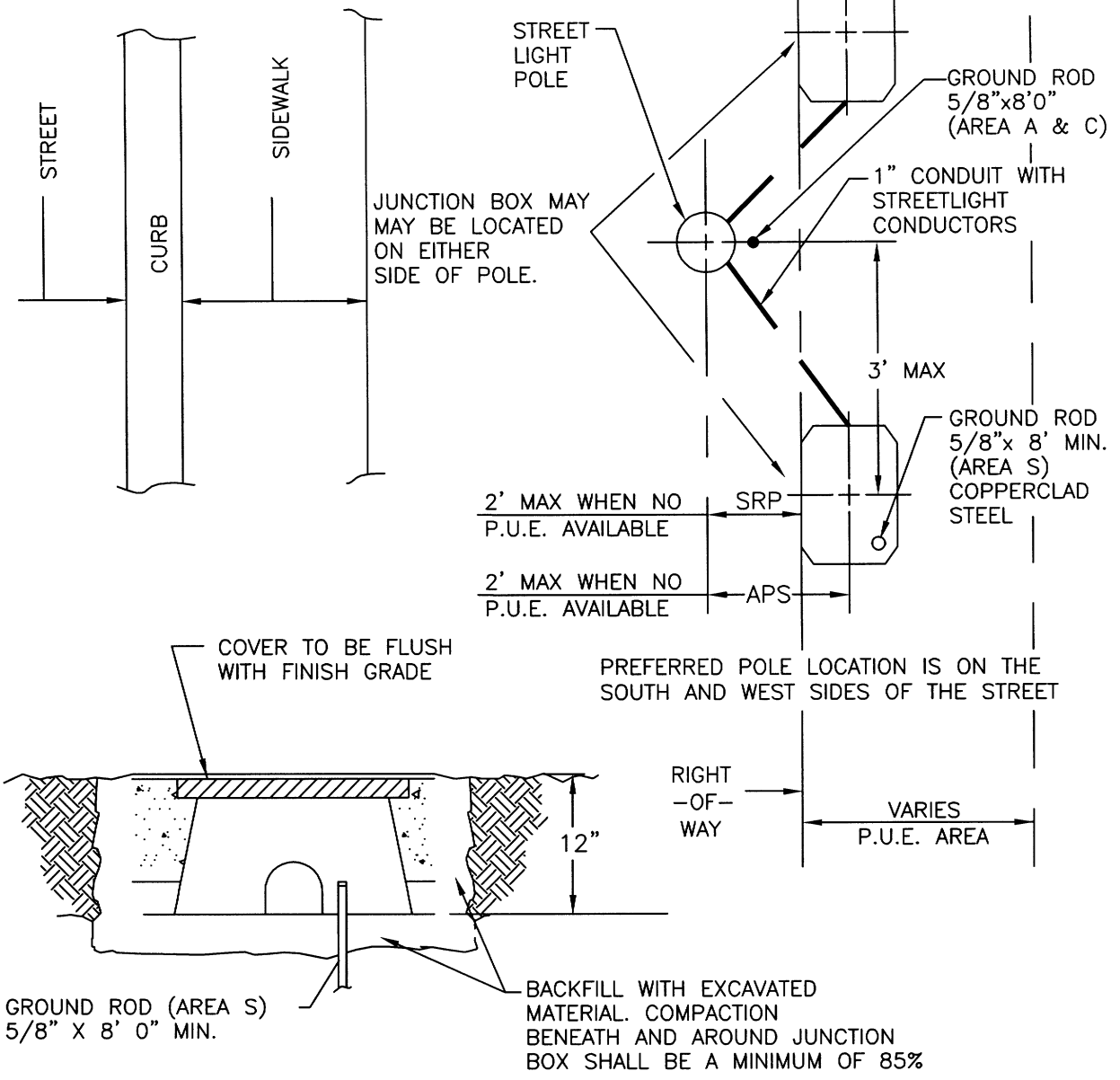


SECTION B-B

NOTE:

THIS FOUNDATION TYPE IS ALSO ACCEPTABLE IN THE OTHER AREAS OF THE CITY WITH THE APPROVAL OF THE CITY ENGINEER.

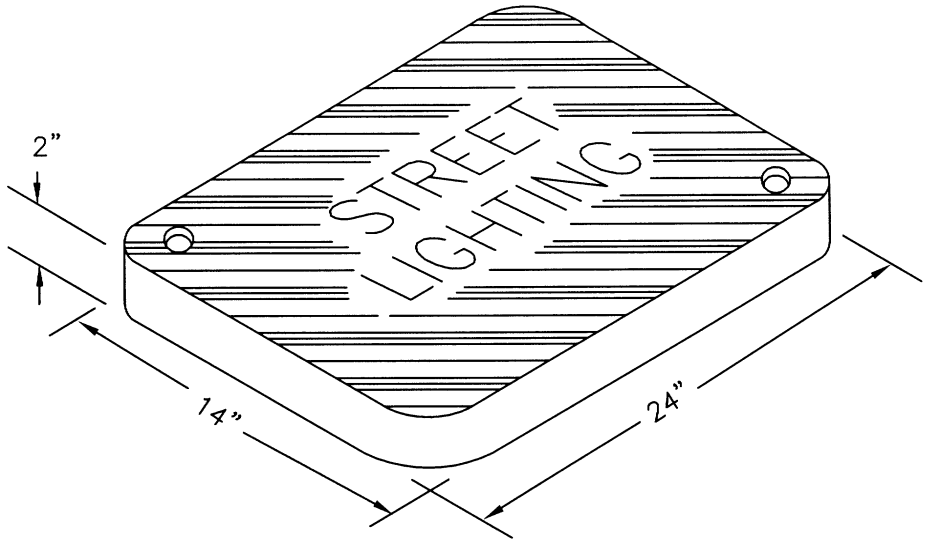
City of Chandler Chandler + Arizona	**FOUNDATION DETAILS** **CITY CENTER STREET LIGHTS** Street Light Standard	DETAIL NO. **SL-13** NTS

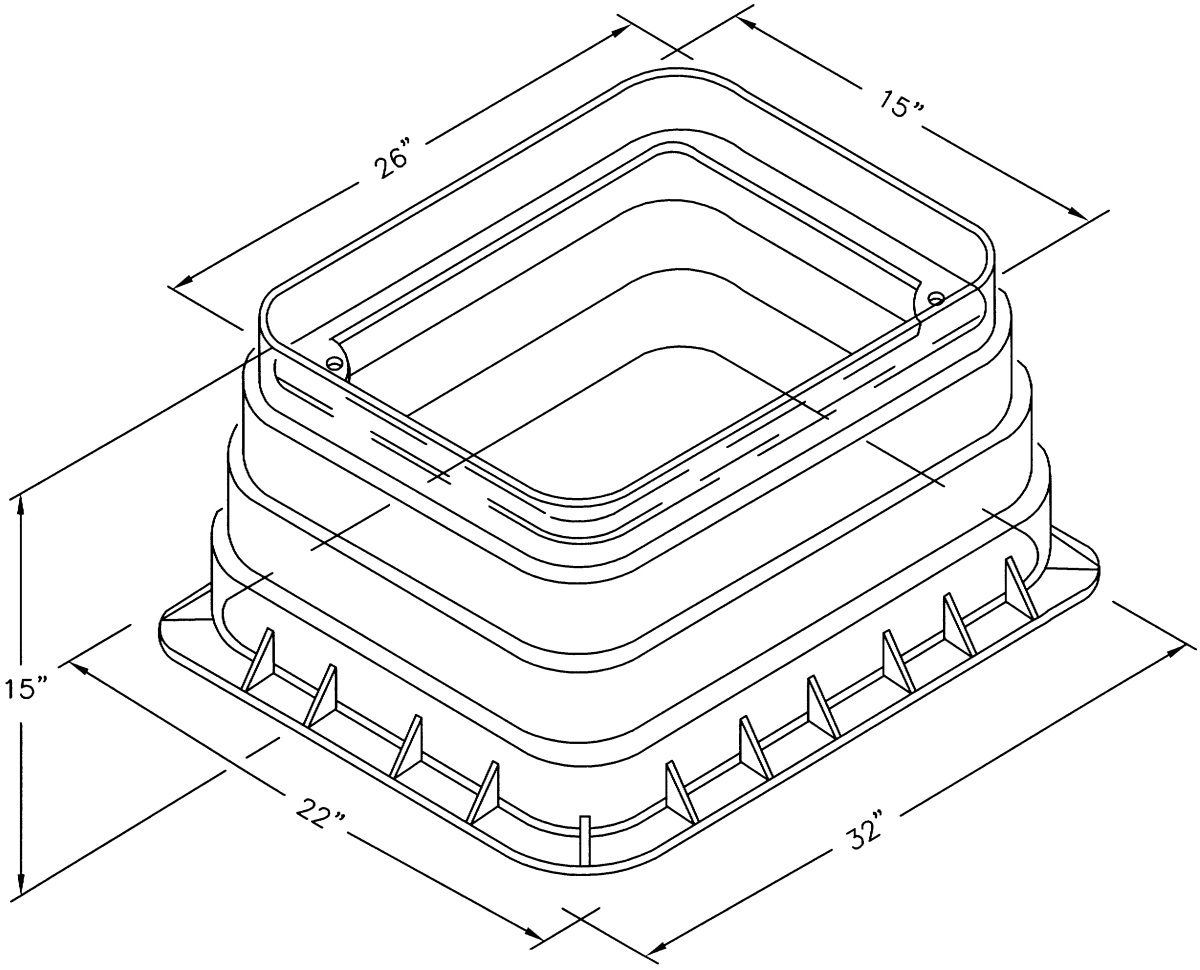


SEE SECTION 10 FOR COVER SPECIFICATIONS

NOTE:
JUNCTION BOXES ARE TO BE PROVIDED BY ARIZONA PUBLIC SERVICE IN AREAS A & C. AREA S JUNCTION BOXES ARE TO BE PROVIDED BY SALT RIVER PROJECT.

City of Chandler Chandler + Arizona	**JUNCTION BOXES** Street Light Standard	DETAIL NO. **SL-14A** NTS





DIMENSIONS SHOWN ARE APPROXIMATE. ACTUAL DIMENSIONS TO BE APPROVED BY THE CITY ENGINEER.

City of Chandler

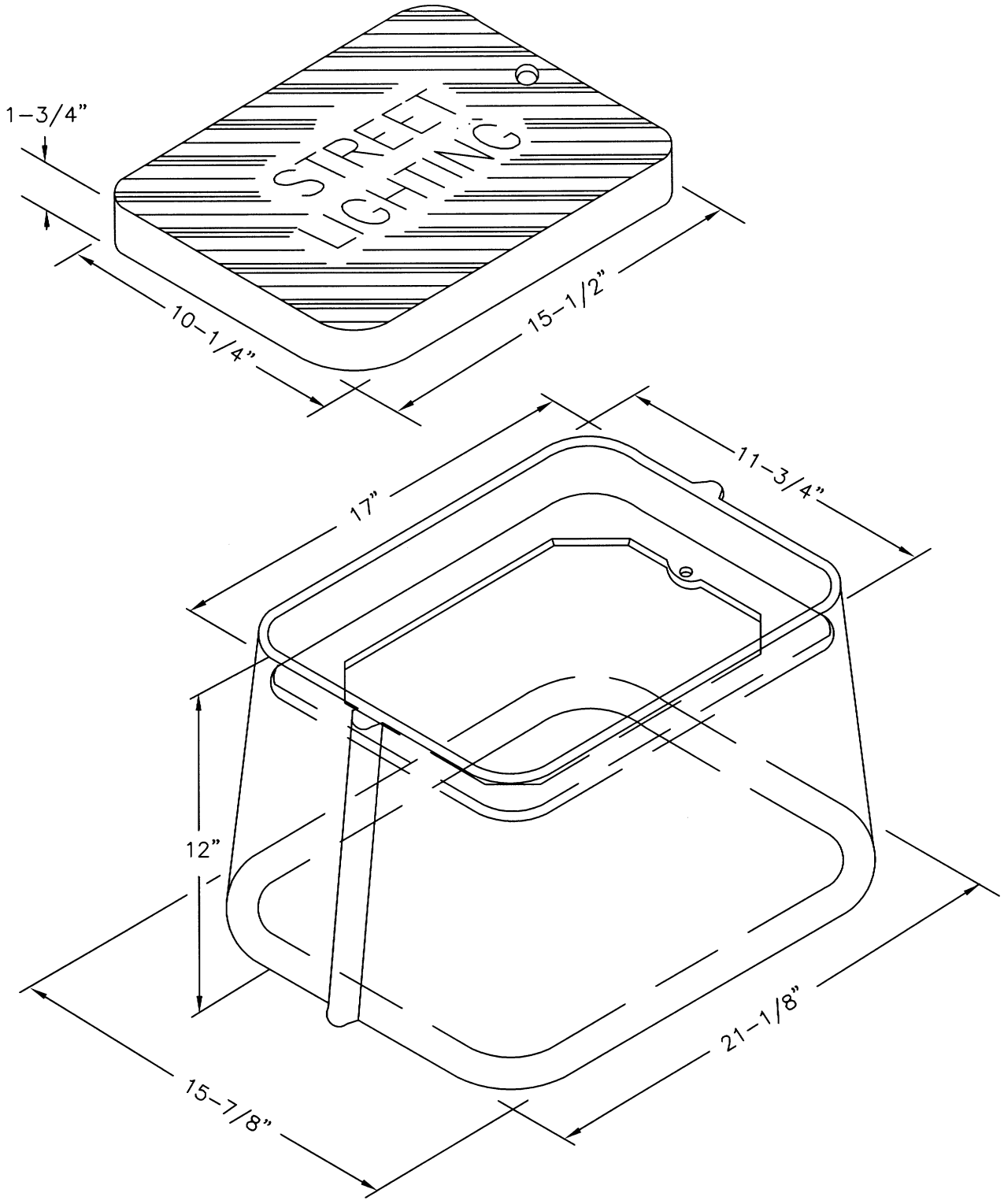
Chandler • Arizona

14" X 24" JUNCTION BOX
APS SERVICE AREA
Street Light Standard

DETAIL NO.

SL-14B

NTS



DIMENSIONS SHOWN ARE APPROXIMATE. ACTUAL DIMENSIONS TO BE APPROVED BY THE CITY ENGINEER.

City of Chandler
Chandler + Arizona

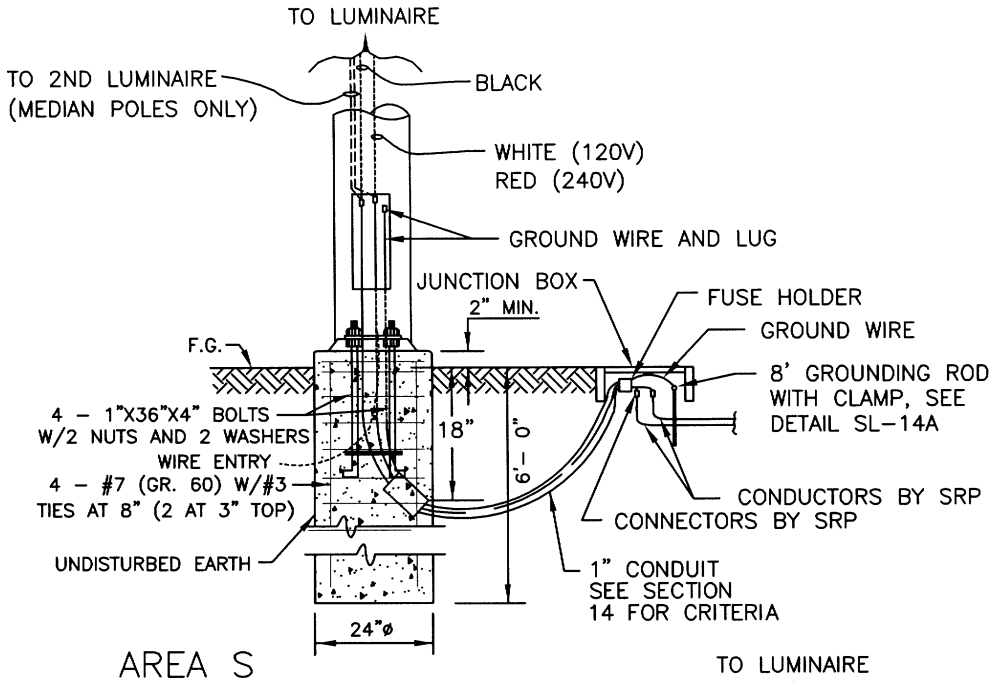
10" X 15" JUNCTION BOX
APS AND SRP SERVICE AREA

Street Light Standard

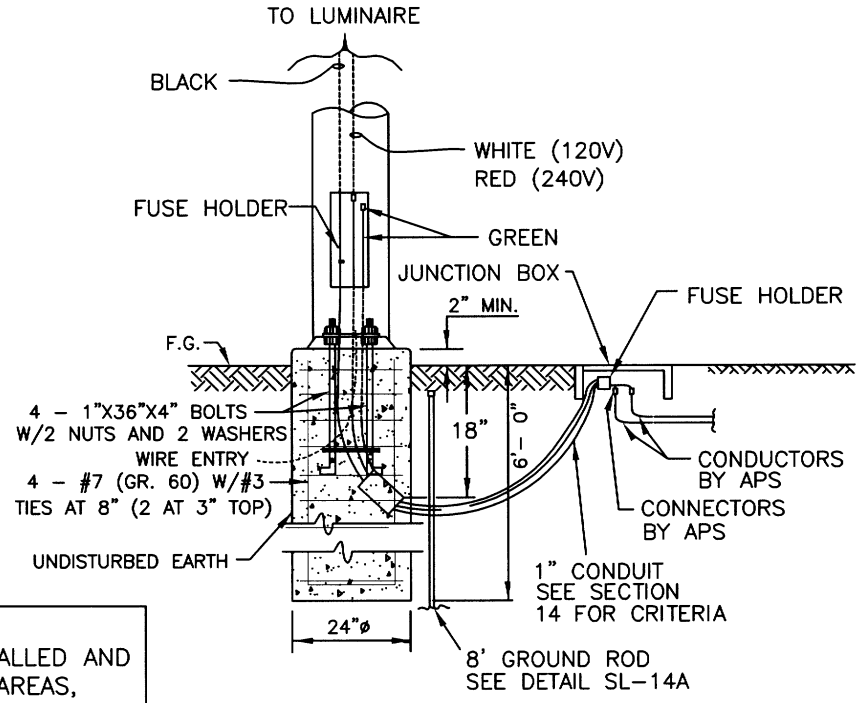
DETAIL NO.

SL-14C

NTS



AREA S



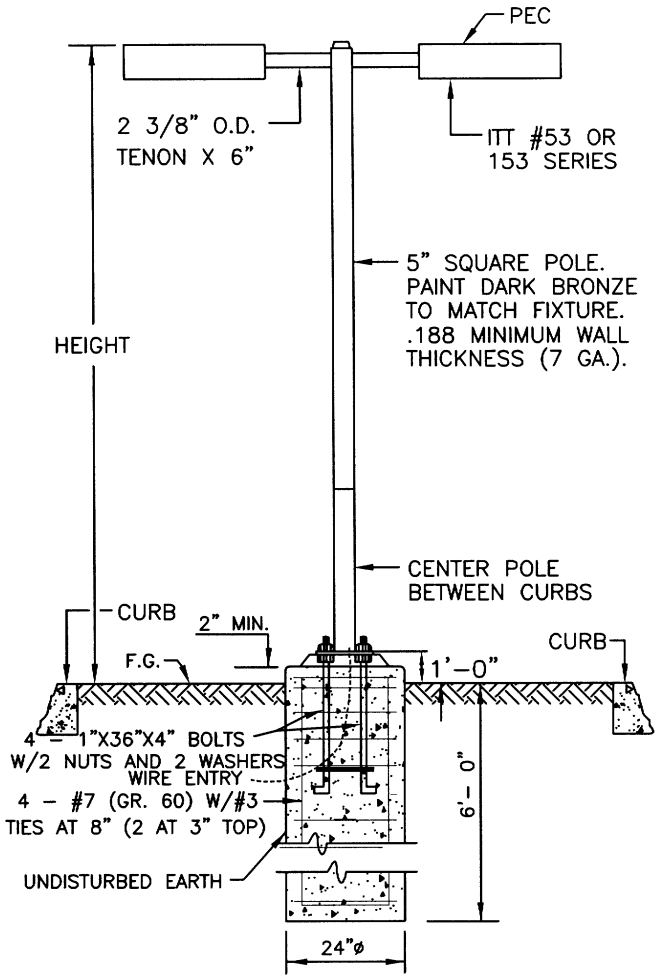
AREAS A & C

NOTES:
1. FOR CITY OR DEVELOPER INSTALLED AND CITY MAINTAINED FUSING IN APS AREAS, APS TO PROVIDE AND INSTALL 15AMP FUSES IN JUNCTION BOX. CUSTOMER FUSING IN THE HANDHOLE NOT TO EXCEED 10 AMPS. FOR APS REQUIREMENTS CONTACT ENGINEERING.

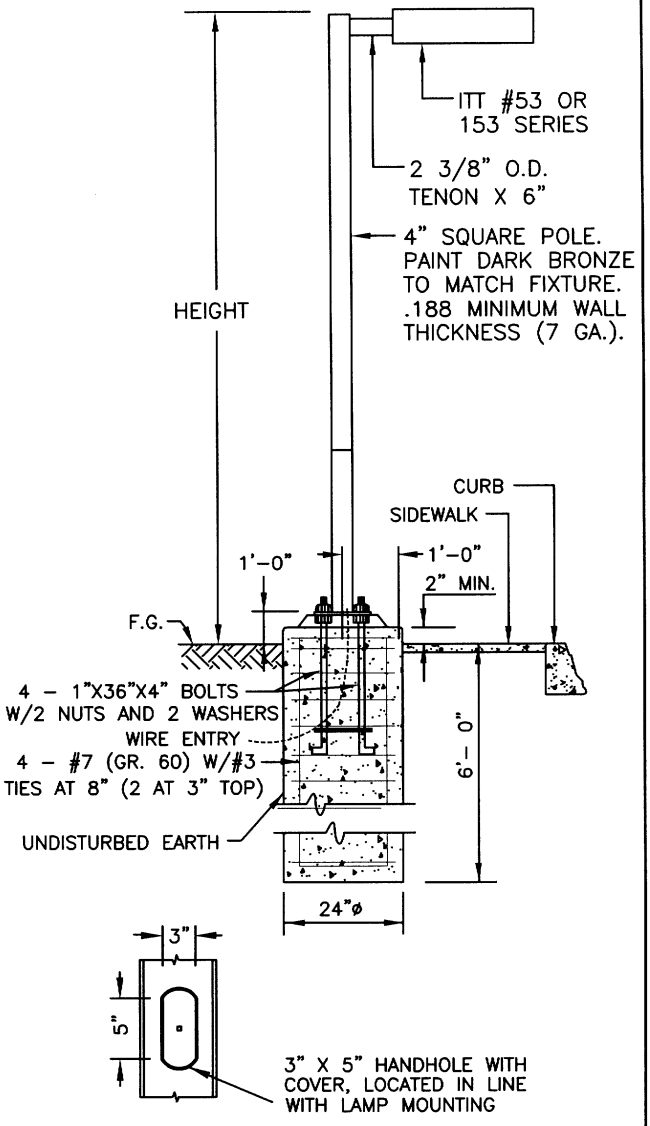
2. FOR CITY OR DEVELOPER INSTALLED AND CITY MAINTAINED FUSING IN SRP AREAS CONTACT SRP ENGINEERING FOR REQUIREMENTS.

City of Chandler Chandler + Arizona	**CONNECTION DETAILS** Street Light Standard	DETAIL NO. **SL-15** NTS

DOUBLE DAVIT ARM IN MEDIAN



SINGLE DAVIT ARM



NOTES:

1. ALL REQUIREMENTS OF STANDARD POLES APPLY TO THE DECORATIVE POLE SHOWN HERE.
2. THE ABOVE SHOWN STREET LIGHT TYPE MAY BE USED IN SELECTED AREAS OF THE CITY WITH THE APPROVAL OF THE CITY ENGINEER.
3. POLE SHALL BE MINIMUM 1'-0" BEHIND SIDEWALK UNLESS OTHERWISE DIRECTED. IN NO CASE SHALL THE FACE OF POLE BE LOCATED LESS THAN 2'-6" BEHIND THE BACK OF CURB.
4. POLE SHALL BE MIDWAY BETWEEN CURBS OF THE MEDIAN.

STREET TYPE	DESCRIPTION		HEIGHT
LOCAL	9500 LUMEN	100W, HPS	30'
COLLECTOR	16,000 LUMEN	150W, HPS	35'
ARTERIAL	30,000 LUMEN	250W, HPS	35'

City of Chandler
Chandler + Arizona

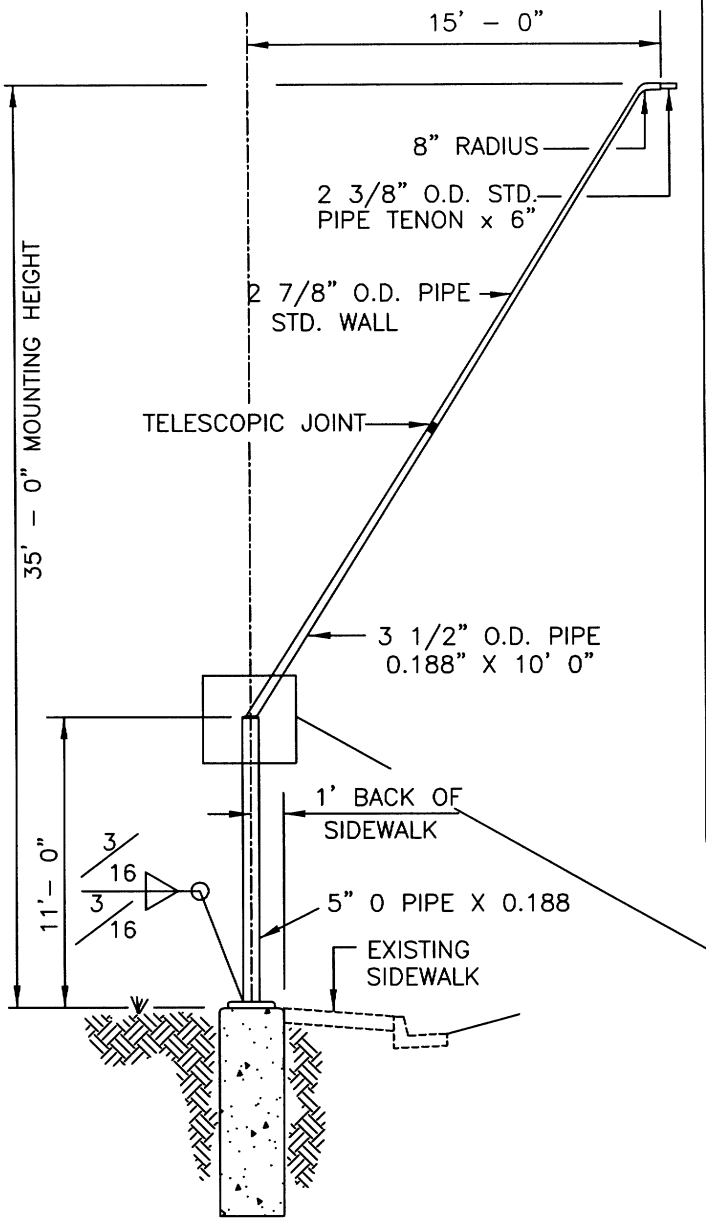
DECORATIVE

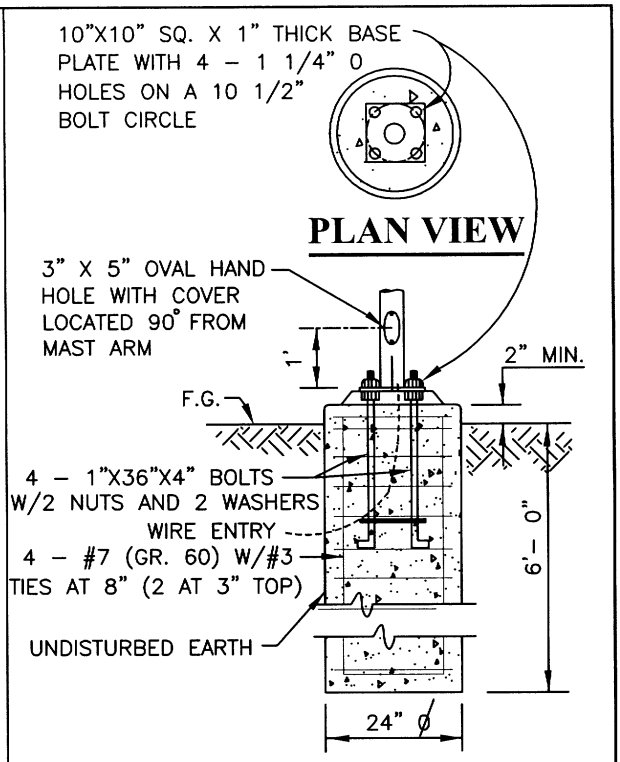
Street Light Standard

DETAIL NO.

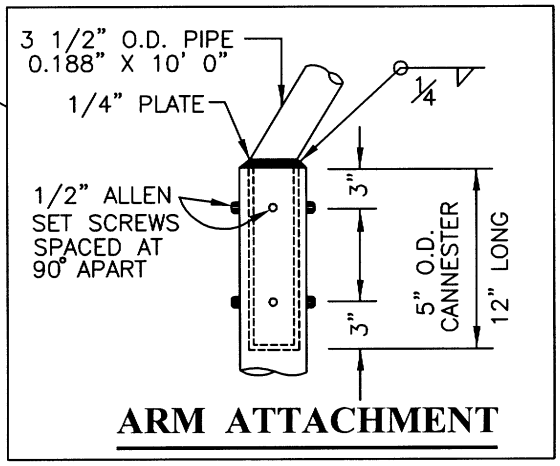
SL-16

NTS





BASE PLATE & FOUNDATION DETAIL



ARM ATTACHMENT

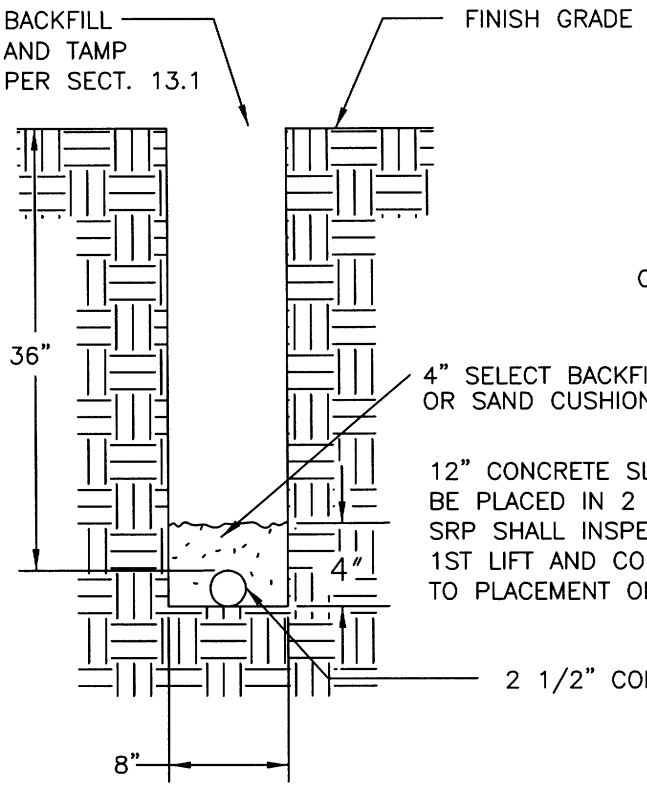
NOTES:

1. POLE, BASE PLATE AND ANCHOR BOLTS DESIGNED PER AASHTO 80.
2. PIPE STEEL (ASTM A–53 GRADE "B") OR (AP 156X42) ANCHOR BOLTS, BASE PLATE AND MISC. STEET PER ASTM 36.
3. THE HAND HOLE TO BE 3" x 5". THE COVER PLATE TO BE 16 GAUGE. THE COVER IS TO BE SECURED BY MFG.
4. AFTER FABRICATION THE POLE SHALL BE SANDBLASTED TO REMOVE ALL LOOSE SCALE RUST, CORROSION PRODUCTS, GREASE, DIRT AND OTHER FOREIGN PRODUCTS.
5. AFTER SANDBLASTING, THE POLE SHALL BE FINISH PAINTED PER C.O.C. STANDARDS.

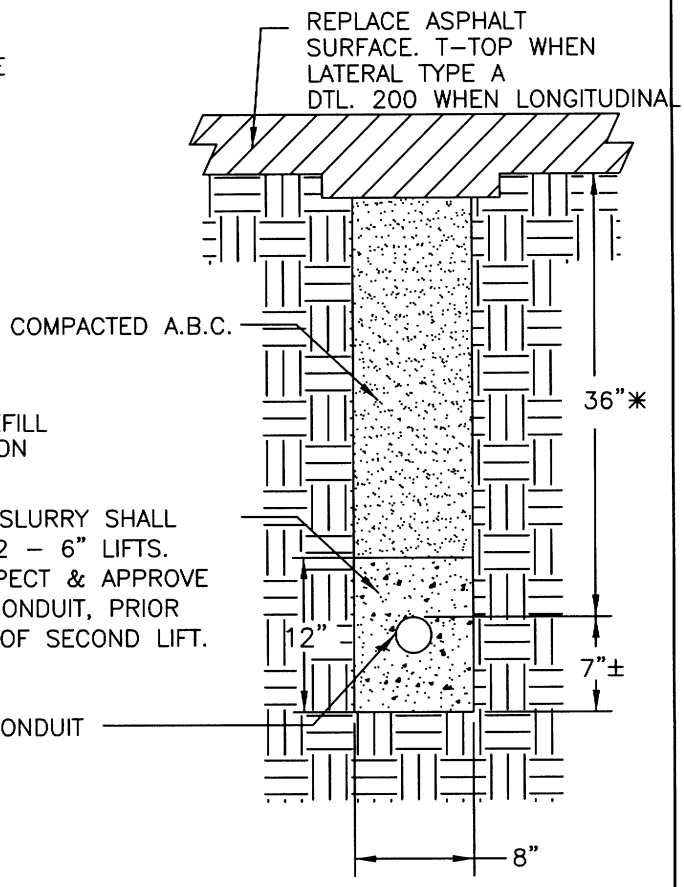
City of Chandler Chandler + Arizona	**ANGLE POLE** Street Light Standard	DETAIL NO. **SL-17** NTS

SRP REQUIREMENTS

STANDARD STREETLIGHT EXCAVATION



CONDUIT ENCASEMENT UNDER PAVED SURFACE ONLY



NOTES:

1. EACH CONDUIT SHALL TERMINATE IN EACH JUNCTION BOX AND/OR POLE FOUNDATION.
2. IF TYPE AND SIZE OF CONDUIT ARE NOT SPECIFIED, THE DEVELOPER SHALL SUBMIT PLANS SHOWING SIZE OF EACH CONDUIT, ITS LOCATION AND THE NUMBER AND TYPE OF WIRES CONTAINED IN EACH, TO THE CITY ENGINEER FOR APPROVAL.
3. THE BOTTOM OF THE TRENCH SHALL BE SMOOTH AND FREE OF OBSTRUCTIONS. SAND OR CLEAN, TAMPED BACKFILL MATERIAL SHALL BE PLACED ON THE BOTTOM IF SHARP ROCKS ARE PRESENT, TO PREVENT DAMAGE TO THE PVC.

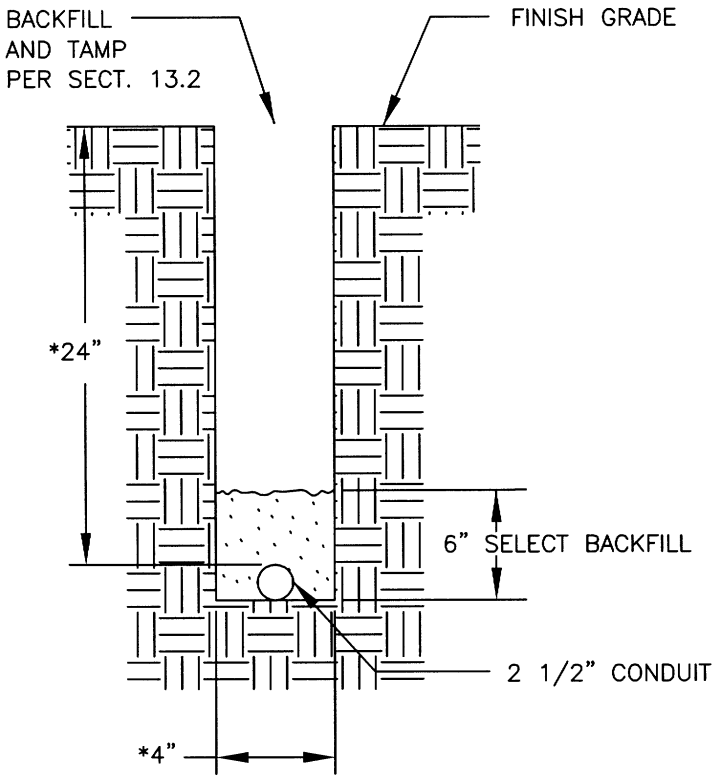
*4. 48" MINIMUM COVER WHEN USED IN PUBLIC UTILITY EASEMENTS (PUE).

City of Chandler Chandler + Arizona	**CONDUIT EXCAVATION CRITERIA** Street Light Standard	DETAIL NO. **SL-18** NTS

APS REQUIREMENTS

STANDARD STREETLIGHT

EXCAVATION

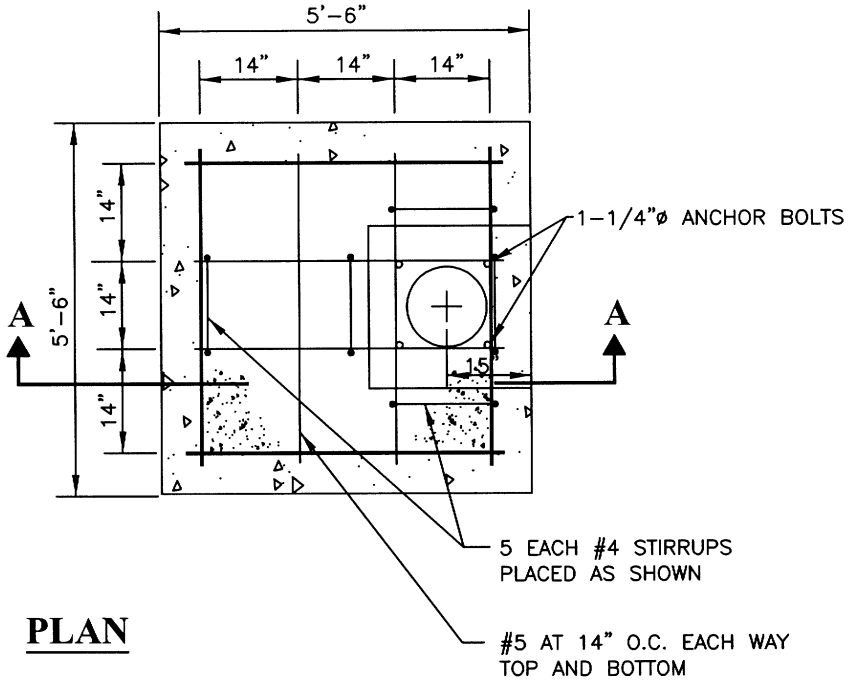


NOTES:

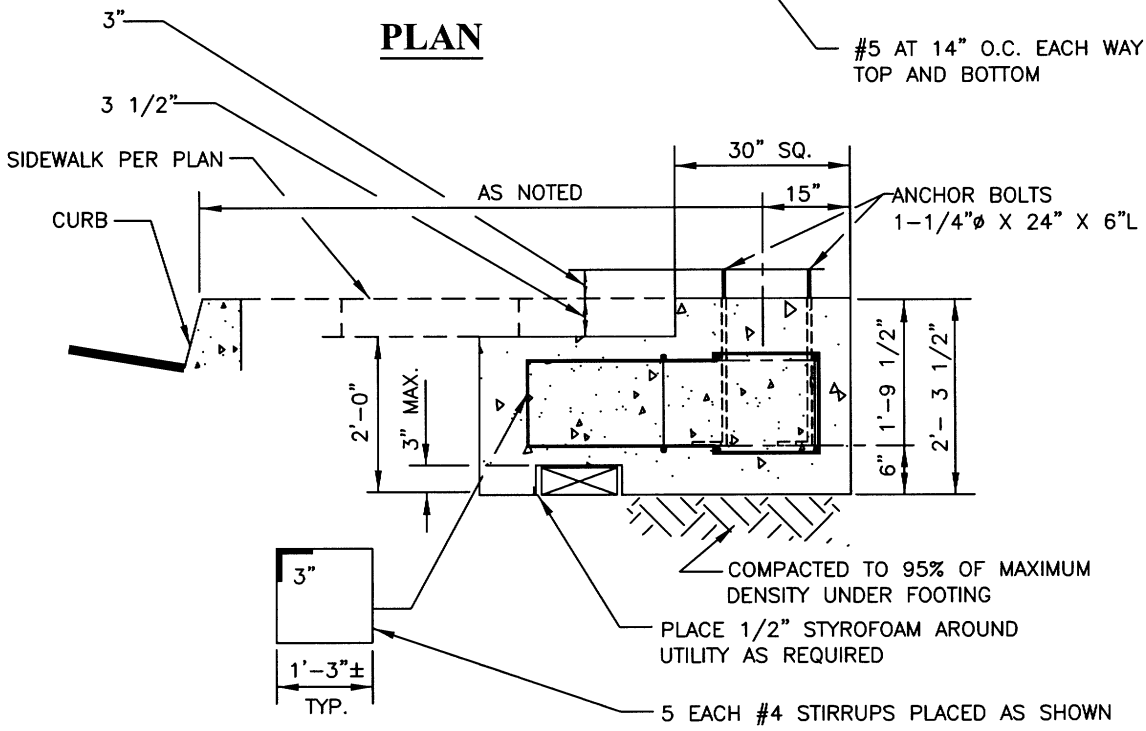
1. EACH CONDUIT SHALL TERMINATE IN EACH JUNCTION BOX, OR WHEN SPECIFIED, IN A POLE.
2. IF TYPE AND SIZE OF CONDUIT ARE NOT SPECIFIED, THE DEVELOPER SHALL SUBMIT PLANS SHOWING SIZE OF EACH CONDUIT, ITS LOCATION AND THE NUMBER AND TYPE OF WIRES CONTAINED IN EACH, TO THE CITY ENGINEER AND APS FOR APPROVAL.
3. THE BOTTOM OF THE TRENCH SHALL BE SMOOTH AND FREE OF OBSTRUCTIONS. SAND OR CLEAN, TAMPED BACKFILL MATERIAL SHALL BE PLACED ON THE BOTTOM IF SHARP ROCKS ARE PRESENT, TO PREVENT DAMAGE TO THE PVC.

*4. 36" MINIMUM COVER REQUIRED WHEN CROSSING STREETS. HOWEVER, IF CONDUIT IS TO BE INSTALLED SHALLOWER THAN 36 INCHES, THE CONDUIT SHALL BE PARTIALLY ENCASED WITH A MINIMUM 4" CONCRETE COVER ON TOP, AND 2" ON THE SIDES, MAKING THE MINIMUM TRENCH WIDTH 7". WHEN THIS ENCASEMENT RULE IS APPLIED, THE CONDUIT SHALL HAVE A MINIMUM COVER OF 24" FROM FINAL GRADE.

City of Chandler Chandler + Arizona	**CONDUIT EXCAVATION CRITERIA** Street Light Standard	DETAIL NO. **SL-19** NTS



PLAN



SECTION A-A

NOTES:

1. NOT TO BE USED WITH STREET LIGHT MASTARMS LONGER THAN 20'.
2. A 20' COIL OF #4 AWG BARE COPPER GROUND WIRE SHALL BE INSTALLED BEFORE THE CONCRETE IS POURED AND CONNECTED TO POLE GROUNDING SCREW IN THE HANDHOLD.
3. NOT TO BE USED WITH SL-10 OR SL-17 POLES.

City of Chandler Chandler ✦ Arizona	**SPREAD FOUNDATION FOR SL-1, SL-1A, SL-6, SL-8 AND SL-16 POLES** Street Light Standard	DETAIL NO. **SL-20** NTS

STANDARD STREETLIGHTING INSTALLATIONS

STREET TYPE AND WIDTH (BC TO BC)	CLASSIFICATIONS	MINIMUM AVERAGE FOOTCANDLES	UNIFORMITY RATIO (AVG. TO MIN.)	POLE TYPE	PATTERN	WATTS	DISTRIBUTION TYPE	MOUNTING HEIGHT	*MAX. SPACING
MAJOR ARTERIAL 100'	Commercial	1.4	3:1	SL-1	Staggered	250	II	35'	130'
				SL-17	Staggered	250	II	35'	145'
				SL-10	Staggered	250	II	40'	165'
	Intermediate	1.1	3:1	SL-1	Staggered	250	II	35'	155'
				SL-17	Staggered	250	II	35'	170'
	Residential	0.8	3:1	SL-1	Staggered	250	II	35'	210'
				SL-17	Staggered	250	II	35'	200'
MINOR ARTERIAL 76'	Commercial	1.4	3:1	SL-1	Staggered	250	II	35'	160'
				SL-17	Staggered	250	II	35'	175'
	Intermediate	1.1	3:1	SL-1	Staggered	250	II	35'	190'
				SL-17	Staggered	250	II	35'	190'
	Residential	0.8	3:1	SL-1	Staggered	250	II	35'	210'
				SL-17	Staggered	250	II	35'	200'
INDUSTRIAL COLLECTOR 65'	Commercial	1.1	4:1	SL-1	Staggered	250	II	35'	225'
				SL-16	Staggered	250	III	35'	205'
	Intermediate	0.8	4:1	SL-1	Staggered	250	II	35'	265'
				SL-16	Staggered	250	III	35'	285'
RESIDENTIAL COLLECTOR 45'	Commercial	1.1	4:1	SL-1	Single Sided	250	II	35'	150'
				SL-10	Single Sided	250	II	30'	165'
				SL-16	Single Sided	250	III	35'	145'
	Intermediate	0.8	4:1	SL-1	Single Sided	250	II	35'	200'
				SL-16	Single Sided	250	III	35'	200'
	Residential	0.5	4:1	SL-1	Single Sided	150	II	35'	185'
				SL-16	Single Sided	150	III	35'	180'
LOCAL 35'	Commercial	0.7	6:1	SL-1	Single Sided	150	II	35'	160'
				SL-10	Single Sided	150	II	30'	185'
				SL-16	Single Sided	150	II	30'	155'
	Intermediate	0.5	6:1	SL-1	Single Sided	150	II	35'	195'
				SL-16	Single Sided	150	II	30'	215'
	Residential	0.3	6:1	SL-1	Single Sided	100	II	30'	195'
				SL-16	Single Sided	100	II	30'	210'

***MAXIMUM SPACING FOR ALL ROADWAYS IS BETWEEN POLES ON SAME SIDE OF ROADWAY.**

MAXIMUM POLE SPACINGS LISTED ABOVE MAY BE EXCEEDED BY UP TO 10 PERCENT TO ACHIEVE RATIONAL SPACING AND LOCATION OF STREETLIGHT POLES. ALTERNATIVE INSTALLATIONS MUST BE DESIGNED TO MEET STANDARDS FOR MINIMUM AVERAGE FOOTCANDLES AND UNIFORMITY LISTED ABOVE USING LIGHT LOSS FACTOR OF.71.

COMMERCIAL – DOWNTOWN AREAS, REGIONAL SHOPPING CENTERS AND MALLS, MAJOR SPORT COMPLEXES, AND OTHER AREAS WITH A HIGH LEVEL OF NIGHTTIME VEHICULAR AND PEDESTRIAN ACTIVITY.

INTERMEDIATE – BLOCKS CONTAINING LIBRARIES, COMMUNITY CENTERS, OUTLYING BUSINESS DISTRICTS, COLLEGES, NEIGHBORHOOD SHOPPING CENTERS AND OTHER AREAS WITH A MODERATE LEVEL OF NIGHTTIME VEHICULAR AND PEDESTRIAN ACTIVITY.

RESIDENTIAL – RESIDENTIAL DEVELOPMENTS, OUTLYING BUSINESS DISTRICTS, AND OTHER AREAS WITH A LOW LEVEL OF NIGHTTIME VEHICULAR AND PEDESTRIAN ACTIVITY.

CITY OF CHANDLER TRAFFIC ENGINEER TO DETERMINE WHICH CLASSIFICATION IS TO BE USED IN DESIGN.